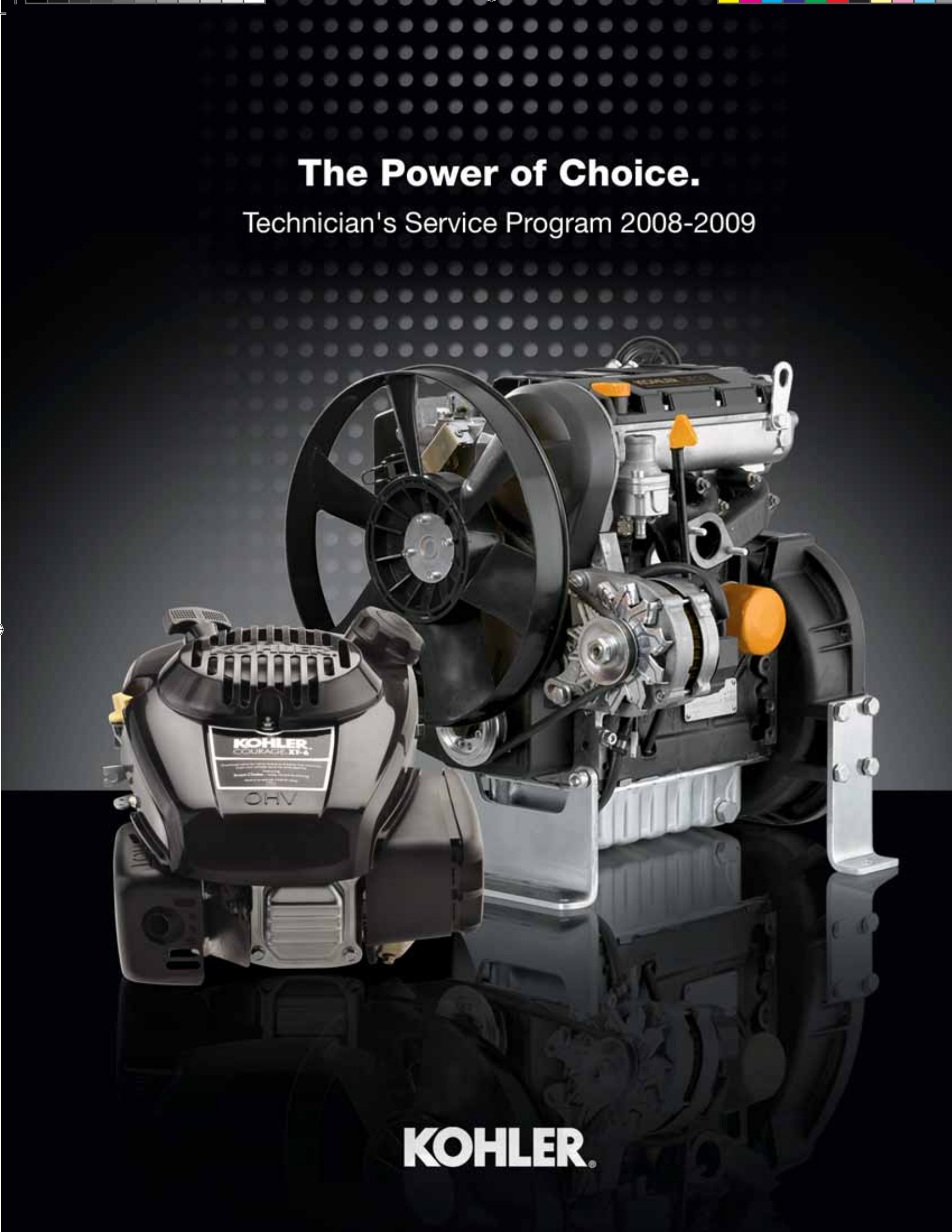
The Power of Choice.

Technician's Service Program 2008-2009



KOHLER.

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Section 1 - Command Series

General

SAE-30 Oil Above 50°F (10°C)
It has been standard practice and was recommended forever to use 10W-30 oil in all Command hydraulic lifter applications. Testing has recently shown benefits such as improved emissions and reduced oil consumption when SAE-30 oil is used in warm weather.

Kohler has given approval to use SAE-30 oil in engines that use hydraulic lifters, if the ambient temperatures are above 50˚F (10°C). It will also require that the customer change oil when seasonal temperature changes occur.

It is still recommended that 10W-30 oil be used when operating temperatures are below 50˚F (10°C).

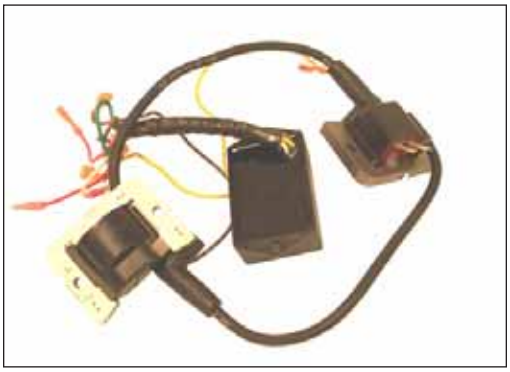
Approved Warm Weather Oil

Command Twin

DSAI Conversion Kit Reminder
This reminder is a caution to avoid the pitfall of attempting to upgrade an analog SAM to a DSAI. Some of our distributors have reported receiving calls looking for this mysterious conversion kit. It does not exist. ***The two systems are not compatible.***

The digital and analog SAM systems use the same ignition modules (24 584 36-S), however the circuitry in the digital SAM modules work differently than the analog SAM modules. The flywheel timing is also different to accommodate each system.

The safest policy is always to order your parts by the engine spec and serial number. If your spec number reveals a digital SAM system and it is no longer available, the part number will supersede to a DSAI conversion kit, which will include a wiring harness and the correct ignition modules required.


No Conversion - Order by Engine Spec and Serial Number

Diode Upgrade

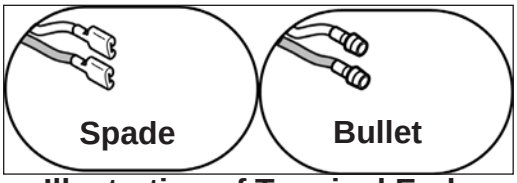


Illustration of Terminal Ends

DSAI Wiring Harness Upgrade

To combat occasional voltage spikes, we have upgraded the wiring harness for both the vertical and horizontal engines.

These spikes have been random, unidentified, and could occur for a variety of different reasons, but ultimately destroy the DSAI. The upgrade adds diodes to the harness to protect the DSAI up to 3000 watts. This step was taken to prevent the potential for repeat failures, and an upgrade of the wiring harness is recommended anytime this type of failure happens.

These kits are an interim repair while the DSAI is being redesigned to include the upgraded diodes needed to prevent any future incidents. Refer to Service Bulletin 291 in “Bulletins, Etc.” for further information and illustrations.

Wiring Harness Part Numbers

- Spade Terminal - 24 176 153-S
- Bullet Terminal - 24 176 154-S

See TechTip 2008-01 and 2008-02

Electronic Governor

There have been some concerns regarding the function, adjustment, and troubleshooting of the electronic governor system. TechTips 2008-01 and 2008-02 have been written to cover any and all concerns regarding the Electronic Governor.

These TechTips cover general information, mechanical checks, troubleshooting procedures, blink code information as well as flow chart and electrical diagram information. It is a must read for the savvy technician and is printed in its entirety in this update book.

Incorrect Solenoid Jet (24 757 22-S)
The solenoid kit, Part No. 24 757 22-S has been identified as having been built with the No. 120 jet instead of a plug. When using this kit it usually requires that the plug be removed, and the jet from the original solenoid be transferred to the new solenoid.

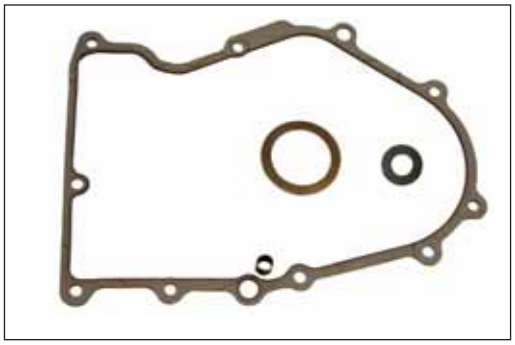
Engines that use this solenoid require a jet from 122–142, therefore use of the 120 jet will affect the performance of the engine. Our stock of these kits has been reworked, and we recommend that yours also be checked and reworked where necessary. Plugs are used when a solenoid is added to a carburetor that was not originally equipped with this feature. The plugs can be obtained through your normal source of supply.

Solenoid and Jet Detail

Oil Pan Leaking on CV730,750 Engines
It has been our practice to use the 24 041 54-S oil pan gasket on all CV Twin commercial spec engines 25 HP and above. Kohler recently learned that a few commercial specs (CV730-3117, CV750-0022) were specified for RTV instead of the pan gasket. New specs have now replaced them with the gasket, but there were about 900 engines built with RTV.

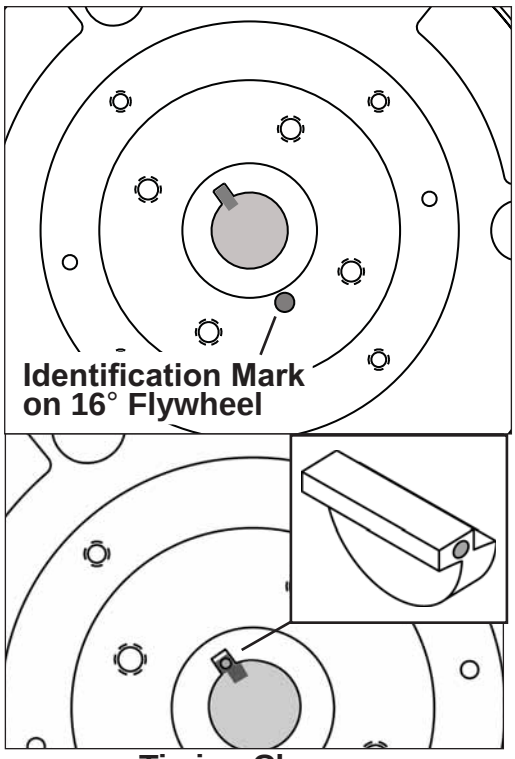
The use of RTV does not cause any problem, as witnessed by thousands of other engines built that way. If the occasion arises it is acceptable to repair the engine with the gasket, however it is also required that crankshaft shim 24 422 05-S, camshaft shim 12 422 07-S, and O-Ring 24 153 08-S be installed at the same time.

In this instance, two shims will be installed on the camshaft. The shims compensate for the added thickness of the gasket, so you don’t end up with excessive crankshaft and camshaft end play.



Oil Pan Gasket and Shim (Order Parts Separately)

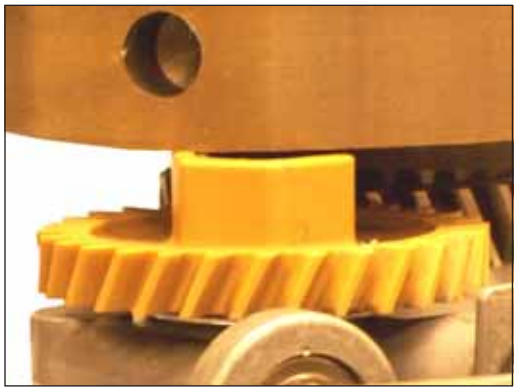
O-Ring 24 153 08-S Must Be Used



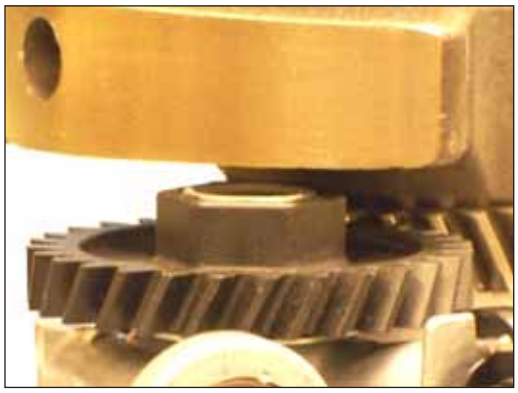
Timing Change

Head Gasket Failures on CH/CV730 (SB-289)
Early production CH/CV730 engines used a flywheel cut for 22° BTDC ignition timing. Head gasket failures had been reported due to excessive combustion pressure. To reduce combustion pressures the flywheel was modified and ignition timing was changed to 16° BTDC.

The newer 16° flywheel is identified by a drill mark located on the face or top of the flywheel and does not require this key. Although replacing the flywheel seems like the easiest repair, a more economical choice is to install the 24 340 02-S offset flywheel key. For more information and correct installation procedures see Service Bulletin 289.



Interference



No Interference

Oil Pump Gear Interference (24 393 51-S)
When the CH/CV750 and LH755/775 were developed in 2005, the stroke of the crankshaft was increased as well as the size of the counter weight. The oil pump was also modified to make room for the larger crankshaft.

The old style pump is 3 mm taller than the new pump. Although it will fit in the block, it will contact the crankshaft if run, causing the engine to fail. Stock of the old style pump was depleted near the end of 2005 when all service pumps, closure plates, and oil pans received the new shorter oil pump.

EFI

New EFI Fuel Pumps (24 393 52-S)
Starting in March 2008, all EFI engines have been built with fuel pumps from a new supplier. Testing has proven the new pump is more robust in both air and liquid-cooled engines.

The new pump is similar in size and design and will interchange as Part No. 24 393 20-S supersedes to Part No. 24 393 52-S.

Old vs. New Pump

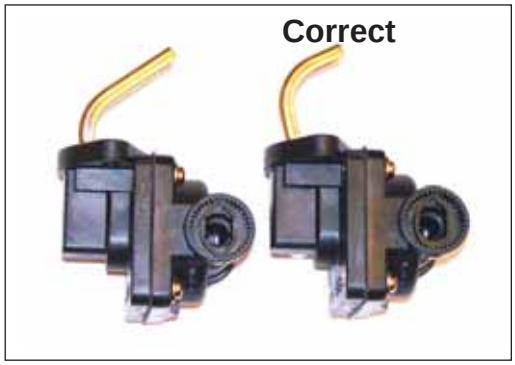
Command Single

Fuel Pump Mix-up
We have received several calls from our service network regarding new Command Single engines that are hard to start or have difficulty performing properly under load. Two engines were identified as having the wrong fuel pump, which restricted the fuel flow causing the poor performance.

An internal inspection of other singles built in that time period, as well as a check of our stock, did not reveal any additional cause for concern. The serial numbers on the two units that were identified are **3802107051** and **3803703561,** or from January 21st to February 6th.

If you have a unit with a serial number in that range exhibiting the symptoms described, check the fuel pump for the correct number. It is stamped on the pump itself and should indicate Part No. 12 393 11. The incorrect pump will indicate a stamping of Part No. 47 393 67.

Replace any incorrect fuel pumps with Part No. 12 559 02-S. Normal warranty applies.



Fuel Pump Mix-up

Section 2 - Aegis Series

LH775-0016 Sputtering

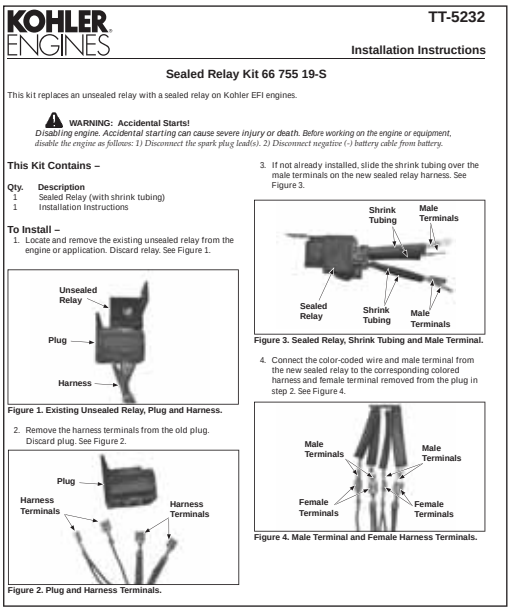
We have received occasional reports concerning some LH775-0016 engines running rough, sputtering, and stalling intermittently. Investigation has revealed the possibility of a poor or loose connection at the engine EFI relay.

Kohler has developed a new relay kit (66 755 19-S) with an all weather connector that seals the terminals from moisture and possible corrosion. The kit includes:

- Sealed Relay
- Relay Plug with Adapter Terminals
- Shrink Tubing
- TT-5232 Instruction Sheet

Normal warranty applies.

Sealed Relay Kit



KOHLER ENGINES

TT-5232

Installation Instructions

Sealed Relay Kit 66 755 19-S

This kit replaces an unsealed relay with a sealed relay on Kohler EFI engines.

WARNING: Accidental Starts!

Disabling engine. Accidental starting can cause severe injury or death. Before working on the engine or equipment, disable the engine as follows: 1) Disconnect the spark plug lead(s). 2) Disconnect negative (-) battery cable from battery.

This Kit Contains –

Qty.	Description
1	Sealed Relay (with shrink tubing)
1	Installation Instructions

To Install –

1. Locate and remove the existing unsealed relay from the engine or application. Discard relay. See Figure 1.

Figure 1. Existing Unsealed Relay, Plug and Harness.

2. Remove the harness terminals from the old plug. Discard plug. See Figure 2.

Figure 2. Plug and Harness Terminals.

3. If not already installed, slide the shrink tubing over the male terminals on the new sealed relay harness. See Figure 3.

Figure 3. Sealed Relay, Shrink Tubing and Male Terminal.

4. Connect the color-coded wire and male terminal from the new sealed relay to the corresponding colored harness and female terminal removed from the plug in step 2. See Figure 4.

Figure 4. Male Terminal and Female Harness Terminals.

TT-5232

Oil Dilution Solution

Applications with light work loads may not cause the engine to labor hard enough to warm the liquid cooled cylinders sufficiently. The relatively cool cylinder walls can cause incomplete vaporization of the fuel. Liquid fuel on the cylinder walls can seep past the rings and end up in the oil sump.

To help solve this issue, Kohler has two optional thermostats available. The standard thermostat for Aegis engines is 190°F (88°C). If fuel is found in the crankcase, you can order and install either:

- 190°F (88°C) Part No. 66 453 02-S
- 205°F (96°C) Part No. 66 453 03-S

Some cases of oil dilution have been noticed after replacing the RC14YC with Command type RC12YC spark plug. Testing has shown that the RC14YC runs approximately 20% warmer than the RC12YC spark plugs. The correct spark plug for all Aegis engines is a **Champion® RC14YC (66 132 01-S)** or equivalent.

New Thermostat

Section 3 - Courage Series

General

Steel vs. Powdered Metal

Courage Ring Gear Failures (SB-285)
In May 2006 Kohler began using powdered metal ring gears on some Courage engines. Due to reported failures in the field, all Courage engines are now built with steel ring gears since early March 2008.

The symptom of a failed ring gear will be a noisy starter that doesn't seem to engage or turn the engine over. Failed gears are not serviced separately and replacement of the complete flywheel assembly is necessary. Please review Service Bulletin 285 revised 3/08 for more information.

Courage Twin

Assembled Cam

Assembled Camshaft
The new automotive style, "assembled camshaft" consists of a machined metal shaft, powdered metal lobes, and a nylon gear.

This design is not new technology, and is used by some of the most successful and well known automotive engine manufacturers in the world. It reduces the noise, weight, and cost of the cam without compromising the durability that Kohler Engines are known for.

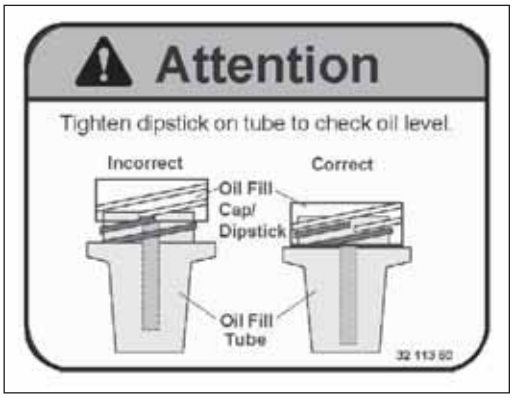
The new straight-cut tooth design will not retrofit into older helical cut crankshaft gears.

The cam will be introduced on the 2009 product line.

Machined Cam

Clearing the Smoke
Service Bulletin 287 has been issued in response to a variety of calls we have received regarding intermittent smoking on Courage twins.

Further investigation has shown the best method for checking oil is to thread the oil fill cap/dipstick into the oil fill tube completely. Resting the oil fill cap/dipstick on top of the tube can add an extra 10 oz. of oil or more to the engine, creating an overfill situation that will cause smoking. A decal is now available to place on the engine shroud detailing this procedure, Part No. 32 113 60-S.



New Decal Part No. 32 113 60-S

Blue Loctite®

Crankcase Sealed With Loctite®

Courage Single

Courage Single

Loose Cover Plate Reminder

Steps have been taken to prevent the future occurrence of loose cover plate bolts. The dates for these guidelines took place at **Serial No. 36285XXXX3**.

If the cover plate bolts are found loose and the crankcase and gasket are intact, remove the loose bolts and inspect the crankcase for cracks or any other significant damage. If none is found, apply blue Loctite® to the threads of the four bolts, reinstall, and torque to 216 in. lbs. (24.4 N·m). Check the tightness of the other bolts and torque as necessary to 216 in. lbs. (24.4 N·m). A policy adjustment for 1.0 hour of labor applies.

Emissions Statement

We are updating the Owner's Manual regarding emissions compliance. We are adding a statement that will recommend the combustion chamber be cleaned between 200 and 400 hours to retain emission compliance status.

This is recommended but not required and will be left to the discretion of the consumer.

New Cam Design

The new design cam reduces the number of parts in the engine as the gear, lobe, and shaft will be assembled as one part.

The assembled cam will provide quality control and consistency in production on the Courage engine equal to the Command Series engines. The design will implement powdered metal lobes that are precision controlled with an interference fit. This change is a retrofit unlike the change to the cam on the Courage Twin.

Assembled Cam

3rd Generation Balance System

Hold on to your seats for an even more robust version of the balance system. Kohler Performance Engineering has developed a lighter balance system to help remove added stress from these moving parts. This change will extend bearing life as well as hold vibration to a minimum for continued customer satisfaction.

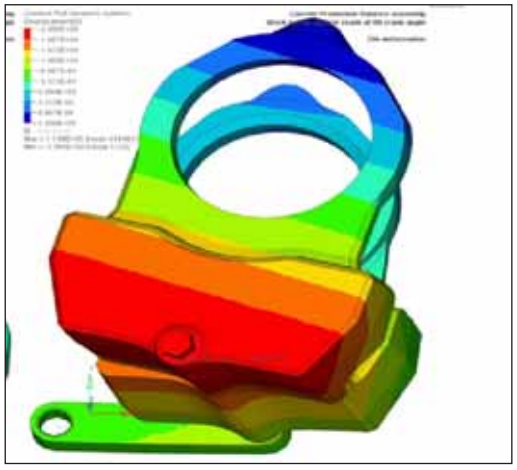
1st Generation

2nd Generation

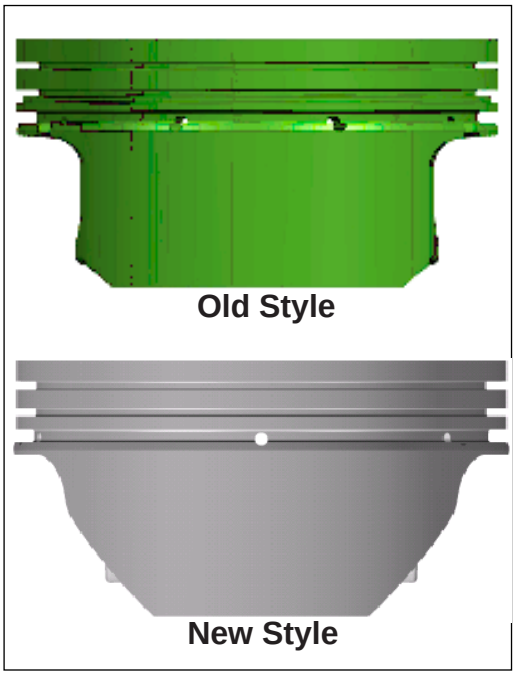
3rd Generation

The new design takes advantage of a single weight with individual parent material “plain bearing” hoops. The old versions used a two piece weight with bearing inserts. The complete assembly had been fastened with a single screw. The new system uses two screws to attach each of the bearing hoops.

This new dual link system is used to keep the weight running true. The old design used a single link that resulted in a twisting of the weight assembly that caused minor fretting on the joint face between the two weight halves.



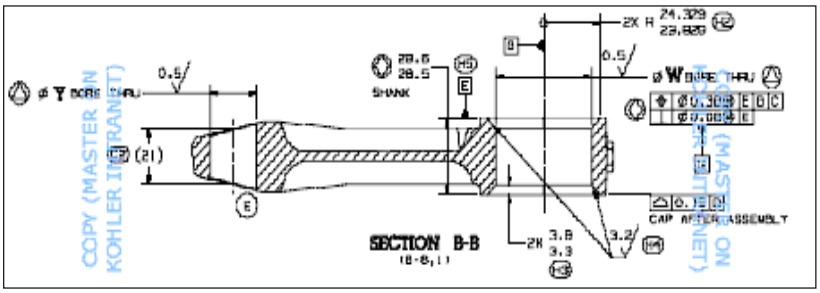
Single Link System



Old vs. New Piston

Less reciprocating mass means less force to balance within the system. That means lower bearing loads and longer engine life. To accomplish this, the piston was completely redesigned to reduce mass. Advantages include:

- Wider skirt for better heat transfer from the crown
- Pin height is raised 2 mm to reduce weight
- Skirt is 2 mm longer for a better guide in the bore
- Reduced pin diameter from 22 mm to 20 mm



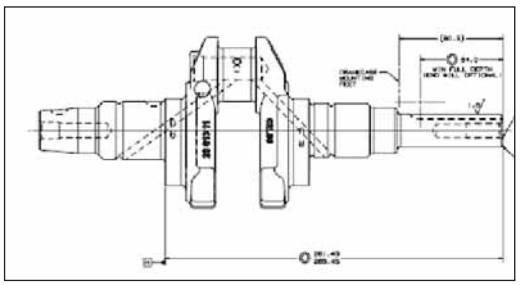
Connecting Rod Detail

The connecting rod went through some changes to allow it to fit into the new piston. This means the pin centers are 2 mm longer and the small end is 2 mm smaller.

The longer connecting rod also helps reduce secondary reciprocating forces. The crankshaft has also been modified to increase the eccentric offset by 1 mm.

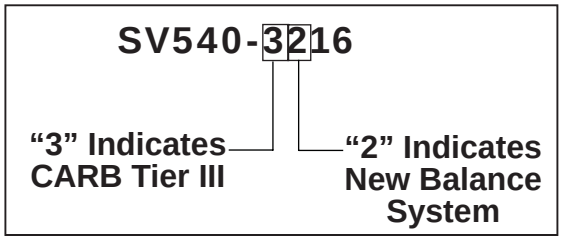
That means the weight will now move a full 18 mm to compensate for the lighter moving parts.

The crankshaft has also been modified to increase the eccentric offset by 1 mm. That means the weight will now move a full 18 mm to compensate for the lighter moving parts.



Crankshaft Detail

Although the engine looks the same on the outside, the balance system resulted in many changes on the inside. Engine specs will change to make servicing the engine as easy as possible. Below is an example of a new spec number:



Decal Reminder

When placing the decal for the short block, make sure it is affixed **next** to the original engine decal, ***not over it***.

The original engine information will be required when servicing any external components.

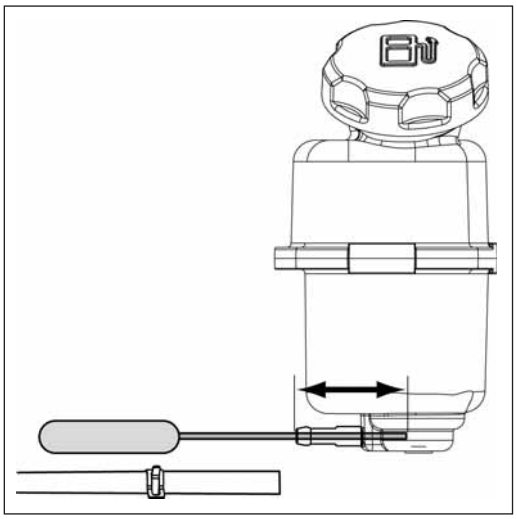
New Balance System Incorporated into Short Blocks

Beginning September 16, 2008 a new balance system with a common bore size was implemented for use on the Courage single cylinder engine. Short blocks using these same configurations are being assembled to service engines built before and after that date.

In order to keep the older engines emission compliant, the new short blocks for the SV470-540 will include a matching carburetor which must be installed as part of the repair.

Because of the different fuel systems (gravity or pressure flow) and engine sizes, a reference chart has been created to identify the correct part number to be ordered. Use the chart listed below or refer to Parts Bulletin 254 for further information.

Engine Model	Fuel System Type	Short Block to Order
SV470/480	Pressure Flow	20 522 08
SV470/480	Gravity Flow	20 522 09
SV530/540	Pressure Flow	20 522 10
SV530/540	Gravity Flow	20 522 11
SV590/600	All	20 522 05
SV610/620	All	20 522 07



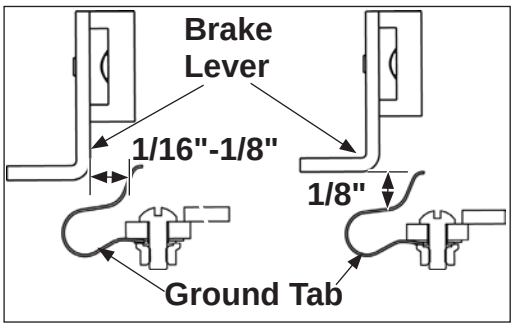
Probe Tank Outlet

Courage XT

XT Fuel Tank Debris

We have found some evidence of debris showing up in the fuel tanks on the XT-7 engine. A thorough investigation of the cause has resulted in these findings.

As a consequence of the vendor's process of "vibration welding", fine hair-like fibers or flashing have been found inside the tank. This has on occasion collected at the tank outlet and blocked or restricted fuel flow. Symptoms like, won't start or won't pick up speed are the common complaint. Cleaning the tank as outlined in Technical Flash KEK-032008 is the immediate fix, but changes in the welding and inspection process has been a permanent solution. The suspect engines were built between **Serial No. 3728100028** through **3730500008**.



Ground Tab Adjustment

Ignition Ground Concern

It is possible that the ignition grounding system on the flywheel brake may remain **open**, even though the brake bail has been released.

Technical Flash 052008 has been written to correct the glitch and a complete copy is located the Bulletins section of this book. The repositioning of the ground tab is simple and corrects the issue.

Visually inspect the position of the brake lever in relation to the brake ground tab with the bail released. If the two surfaces do not come into contact with each other, adjust the curved ground tab by bending it towards the brake pad.

Section 4 - Kohler Diesel

General

Kohler Diesel Service and Support

On May 9, 2007 the Kohler Co. announced that it had entered into an agreement to purchase Lombardini Srl. This acquisition was designed to provide the Kohler Co. with a strong complement to our existing Engine Business. Our goal was, and continues to be, to establish a single worldwide distribution network for the sales and service of gasoline and diesel engines.

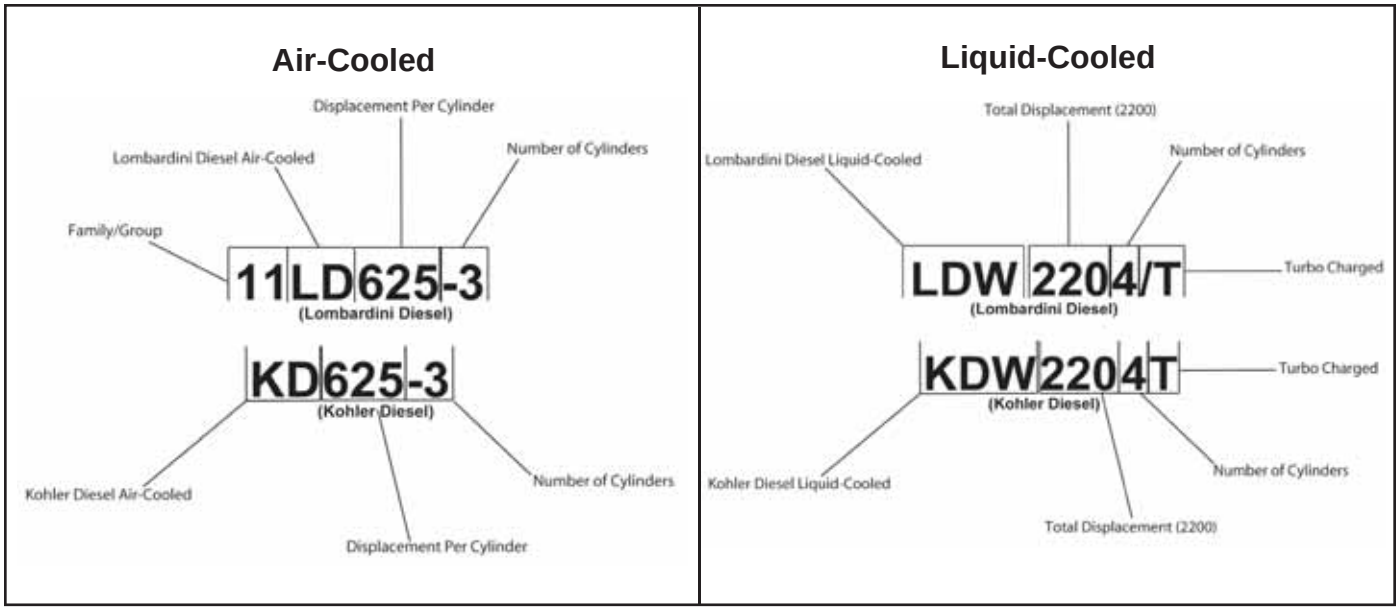
Within the next few months we plan to introduce a comprehensive dealer registration program covering the full range of gasoline and diesel products. This program will provide you an opportunity to service the entire range of Kohler engines. In the meantime, please refer all requests for diesel sales and service support to your local Kohler Central Distributor.

Our goal is to provide our customers with the best possible product offering and service network, while bringing you and the rest of our channel partners more profits. We look forward to working with you to this end.

Model Number Review

The chart below is included to help you become familiar with and more easily identify the diesel product line. It also shows the difference between a Lombardini Diesel model number and a Kohler Diesel model number. You may want to make a copy of this page and place it in a highly visible location for quick reference.

As with gasoline product, the best engine identification is always a serial number. Whenever possible, use the serial number to locate engine information quickly. Unlike Kohler gasoline, the diesel serial numbers ***do not*** have a date code built in.



Explanation of Diesel Engine Model Numbers

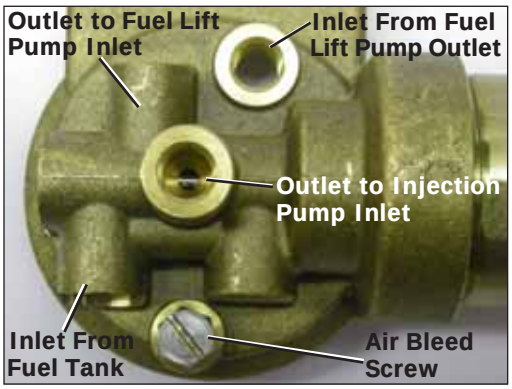
All Air-Cooled Series

Quick Stop Device (QSD)

The quick stop device system, or QSD, is available on all multi-cylinder air-cooled series engines. The system uses an electric solenoid in conjunction with the fuel lift pump and check valves to quickly shut down the engine.

Use of an auxiliary fuel pump before the QSD is not recommended. It is possible that the auxiliary pump can push fuel past the plunger of the QSD and allow the engine to continue running after power is removed from the solenoid.

Kohler Diesel recommends an in-line filter be installed before the QSD to protect the plunger from being damaged by possible contaminates in the fuel system. The in-line filter should be 50 microns or higher and should be changed in conjunction with the spin-on fuel filter recommendations.


Outlet to Fuel Lift Pump Inlet
Inlet From Fuel Lift Pump Outlet
Outlet to Injection Pump Inlet
Inlet From Fuel Tank
Air Bleed Screw

QSD Fuel Line Routing

15LD 400/KD400

Hydraulic Lifter Rocker Arm Torque Procedure

There have been reports in the field of some confusion on the hydraulic lifter rocker arm torque procedure on these engines. The engine uses hydraulic lifters so no valve settings are required. To properly install the rocker arms on this engine follow the instructions below.

1. Make sure the piston is at bottom dead center.
2. Install spacer making sure that the tab on the spacer is aligned with the slot in the cylinder head.
3. Install rocker arm, washer, and nut making sure the push rod is correctly installed in the lifter.
4. Carefully torque the hold down nut to 10 N·m (7.38 ft. lbs.).
5. Allow the engine to sit for approximately four hours to allow the lifters to bleed down.
6. Slowly rotate engine flywheel at least one revolution by using the recoil starter (do not engage starter motor), or by hand to ensure there is no contact between the valves and the piston.
7. Retorque the hold down nut to 10 N·m (7.38 ft. lbs.).

Rocker Arm Spacer Installed

Rocker Arm Assembly Installed

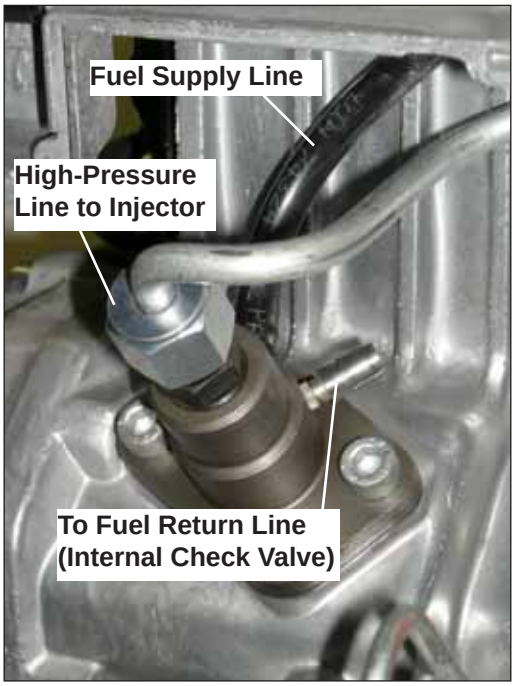
15LD 315-440/KD315-440

Injection Pump Check Valve

We have had some reports from the field of problems with these engines not shutting down properly. If checks of the fuel shut-off valve (if supplied) are found to be OK, then the injection pump check valve should be checked. The check valve may be stuck in the open position, allowing fuel from the fuel return line to be ingested and burned.

To check this, turn the engine key to the **OFF** position (if equipped). If the unit continues to run, crimp the fuel supply line from the fuel shut-off valve (if supplied) to the injection pump. If the engine shuts down, there could be a problem with the fuel shut-off valve.

If the problem still persists then crimp the return line as close to the check valve as possible. If the unit immediately shuts down, the check valve could be stuck open or not seating properly. Replace the complete injection pump.



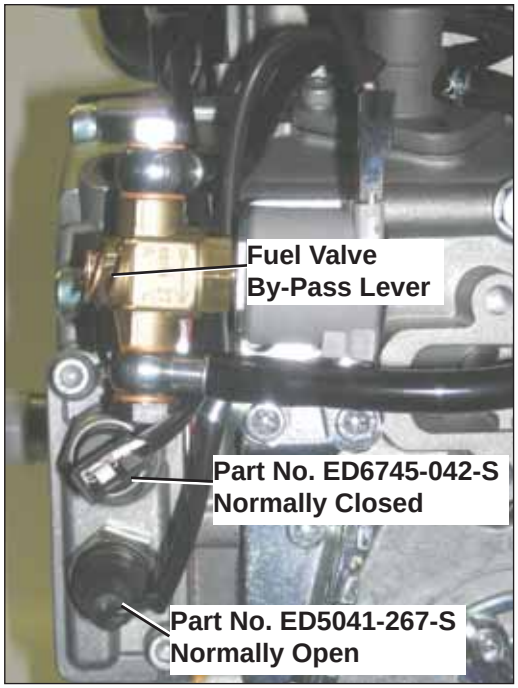
Injection Pump Check Valve Detail

Low Oil Pressure Shut-Down System

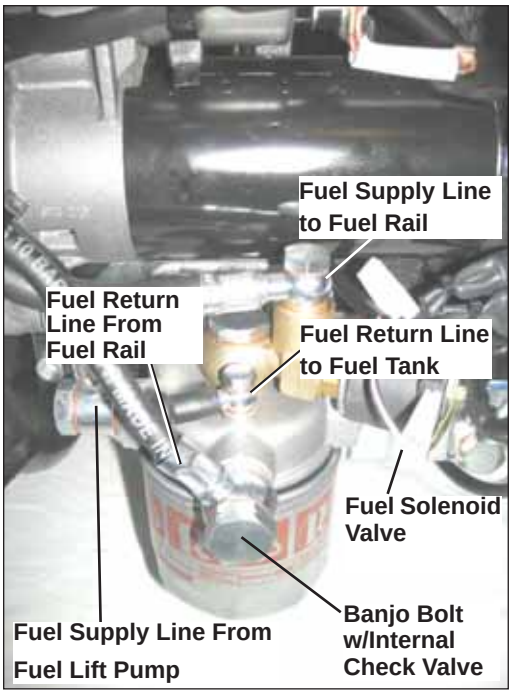
These engines are available with a factory-supplied low oil pressure shut-down system. This protects the engine from damage if it loses oil pressure; a visible warning light turns on and shuts the engine down automatically through the electronic fuel valve.

This system works by using two oil pressure switches. One switch is normally closed and supplies a ground to the warning light. The other switch supplies a ground to the fuel shut-off valve and is normally open. Power to the fuel valve is supplied from the 15/54 terminal of the key switch when in the **RUN** position.

The electronic fuel valve is supplied with a by-pass lever that allows the engine to be started without battery voltage. The electronic fuel valve is by-passed by placing the lever on the electronic valve body in the **up** position.



Low Oil Pressure Shut-Down System


Fuel Supply Line to Fuel Rail
Fuel Return Line From Fuel Rail
Fuel Return Line to Fuel Tank
Fuel Solenoid Valve
Banjo Bolt w/Internal Check Valve
Fuel Supply Line From Fuel Lift Pump

New Style Fuel Filter Head

All Liquid-Cooled Series

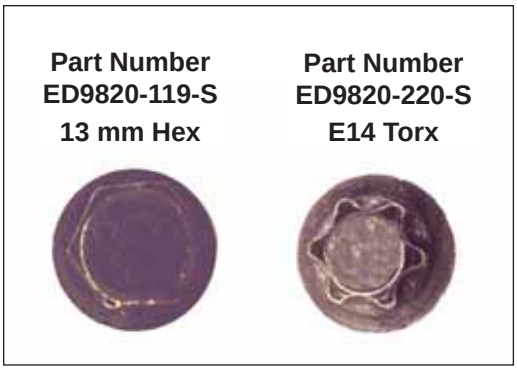
Fuel Filter Head Modification

Beginning at engine **Serial Number 5002295**, the fuel filter head on the above-mentioned engines has been modified.

The new filter head design provides better pressure regulation and reduces fuel lift pump fatigue, resulting in better startability and responsiveness. The old design had two fuel lines attached, while the new one has four fuel lines attached.

In the new system, inlet fuel is supplied from the fuel lift pump to the fuel filter head. The fuel is then routed through the fuel filter and the fuel solenoid valve to the fuel rail. The fuel is then returned from the fuel rail to the fuel filter head. Any excess fuel is then returned to the fuel tank.

The old system routing consisted of the fuel lift pump supplying fuel to the fuel filter head. The fuel then traveled through the fuel filter and electronic fuel valve. The fuel was then delivered to the fuel rail and any excess was returned directly to the fuel tank.



Comparison of Head Bolts

Cylinder Head Bolt Modification

Starting at engine **Serial No. 5552992**, the cylinder head bolt for the LDW 702-1404/KDW702-1404 has been modified. The bolt is functionally the same; the only modification is to the bolt head.

The old style bolt, Part No. ED9820-119-S has a hex head size of 13 mm. The new style bolt, Part No. ED9820-220-S has a torx head size of E14.

The bolt is completely interchangeable as the only change was the head size.

LDW 702-1404/KDW702-1404

New Style

Old Style

Fuel Lift Pump Camshaft Lobe Modification

Starting with the following engine serial numbers:

LDW 702/KDW702	4919204
LDW 1003/KDW1003	4908217
LDW 1404/KDW1404	4904370

The fuel lift pump camshaft lobe has been modified to improve fuel lift pump drive rod and camshaft lobe wear, while also allowing easier parts replacement.

The new style camshaft lobe provides the control rod with a seat in the bushing, and therefore will have no direct contact with rotating parts.

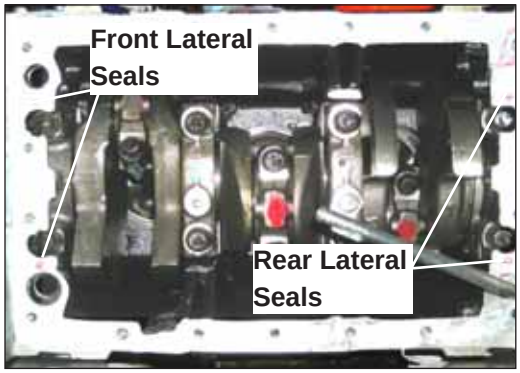
Possible Troubleshooting Symptoms With Updated Fuel Lift Pump Camshaft Lobe

There have been some reports in the field of the fuel lift pump drive rod coming out of its seat in the camshaft lobe bushing.

This could happen if the manual pump lever on the fuel lift pump is operated while the engine is running, allowing the rod to lose tension and the bushing to rotate.

If a **no start** condition is discovered, use the starter to rotate the engine and check for fuel coming from the fuel lift pump outlet. If no fuel is found during starting, but is seen while pumping with the manual lever, the push rod should be checked to confirm it is in the seat.

Running the engine with the push rod out of the seat may cause damage to the Fuel Lift Pump.

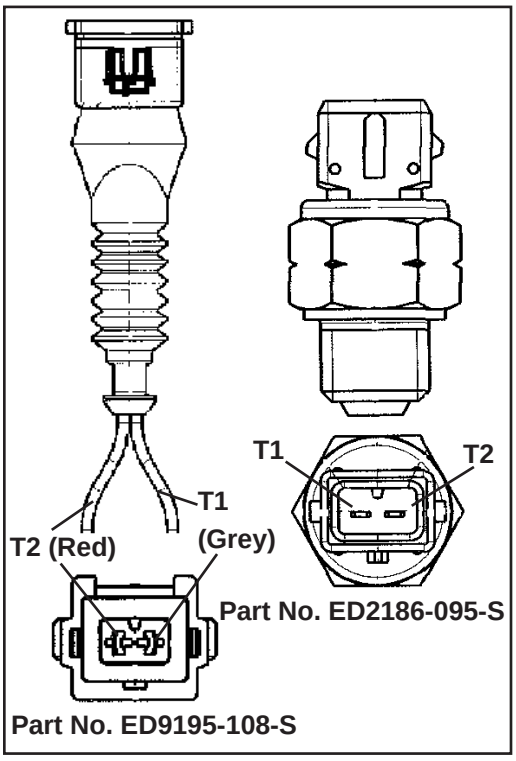


LDW 1003/KDW1003 With Oil Pan Removed

Oil Pan Removal

Please note that when removing the oil pan on these engines, care must be taken not to pull the lateral oil seals, located between the crankcase, front, and rear bearing support, out of their seat. The factory uses a silicone gasket material to seal the oil pan to the crankcase; this sealant may stick to the oil seals.

When removing the oil pan, be sure to use a putty knife or other suitable tool to separate the oil pan from the crankcase. Insert the tool between the oil pan and the crankcase at the seal locations. This will separate the seal from the silicone without damaging the seal.



Coolant Temperature Switches

Coolant Temperature Switch/Coolant Temperature Thermistor Change

Starting at engine **Serial Number 4961990**, the Coolant Temperature Thermistor (Part No. ED9195-094-S) and Coolant Temperature Switch (Part No. ED9195-077-S) have been replaced.

The two switches have been replaced by a single switch (Part No. ED9195-108-S) that performs both functions.

Note: If replacing the old style switches with the current style single switch, you must use pigtail Part No. ED2186-095-S to adapt the engine side harness to the new style connector.

Control Panel Indicator Lights

The control panel on the LDW/KDW series of engines has a self-contained engine safety shutdown system as well as several warning indicators.

The engine will shut down for the following reasons:

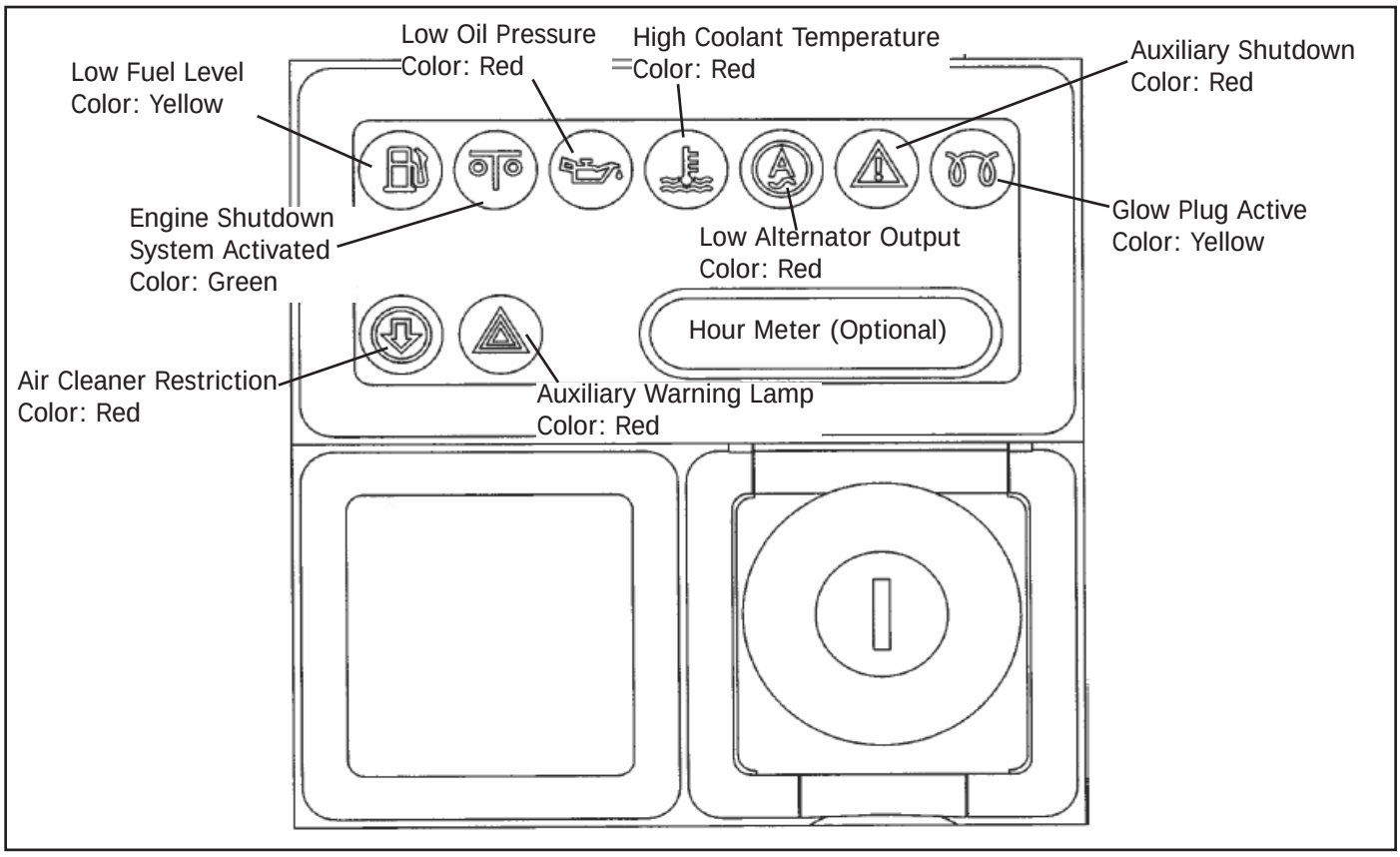
Low Oil Pressure
High Coolant Temperature
Low Alternator Output
Auxiliary Shutdown

The following are warning lights only:

Low Fuel Level
Air Cleaner Restriction
Auxiliary Warning

The auxiliary shutdown and auxiliary warning lights are used by manufacturers for optional shutdown and warning.

If the engine shuts down due to a safety shutdown circuit, only the engine shutdown system light and the light representing the shutdown will remain on.



Control Panel Detail

New Style Key/Key Switch

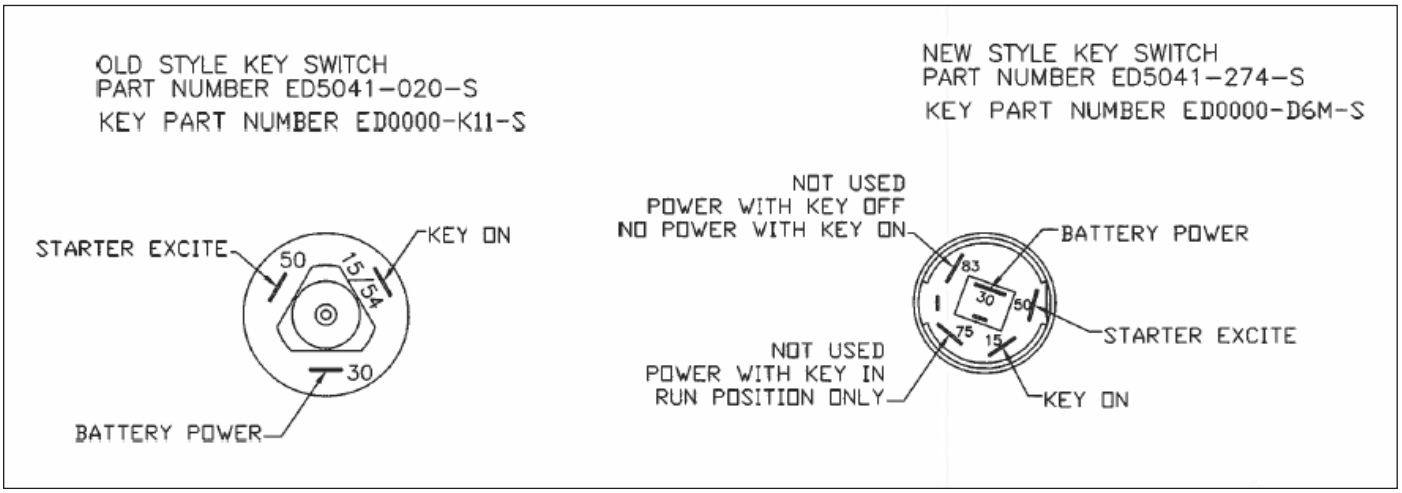
Old Style Key/Key Switch

Key/Key Switch Change

Starting at engine **Serial Number 5252706**, the engine key/key switch has been changed to a new style that incorporates a sliding cover. This prevents debris from contaminating the key switch body when the key is removed. The key switch body also has leak holes for drainage.

The new key/key switches are supplied on all liquid-cooled engines after the above serial number, as a spare part separately, as well as installed in Control Panel Part No. ED7245-453-S and ED7245-454-S.

The old style key is cut on one side and the new style is cut on both sides.



Key Switch Detail

Section 5 - New Product

Kohler Introduces New Command Pro Horizontal Engine Line

Kohler Engines is pleased to introduce a new line of product that exceeds the current offering of any other manufacturer in the industry.

With a 6 to 14 HP range and standard features that meet or exceed other offerings in the market place, Kohler is well positioned to capture our share of this expanding product arena, continuing our mission to be the industry leaders, and providing our customers with manufactured goods that contribute to a higher level of *Gracious Living*.

Command Commercial Horizontal Engine

Replacement Capabilities
Drop in fit without modification for the largest competitor in the market.

Slant Cylinder Design
This design provides a package that economizes space for a compact fit and appearance.

Slant Cylinder Design

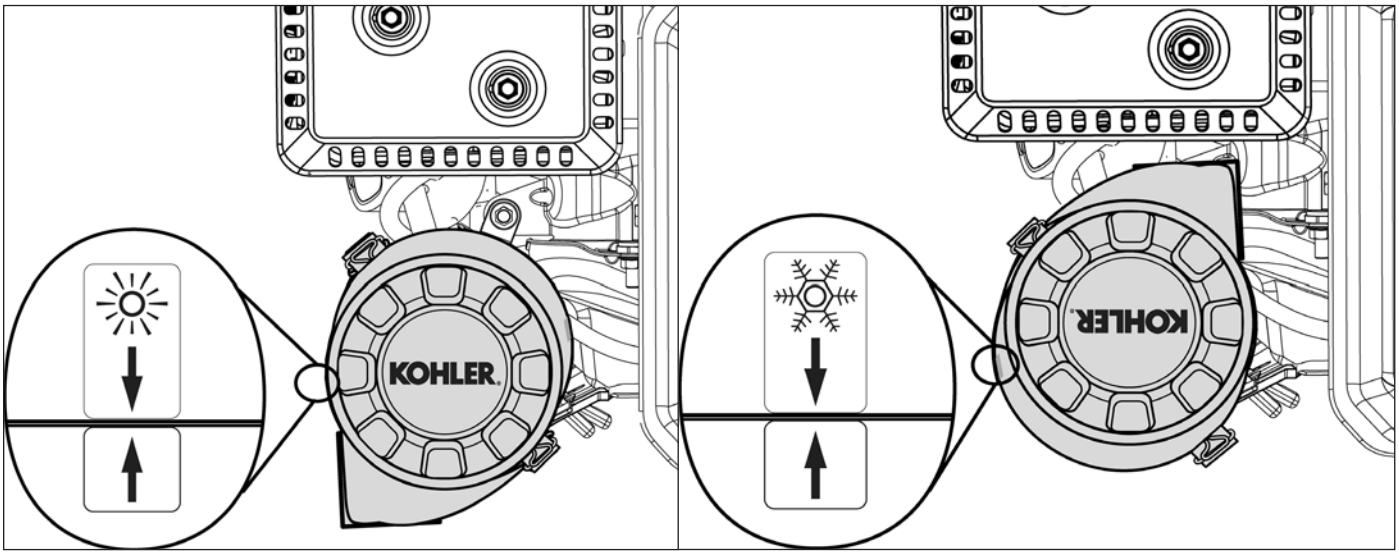
Larger Fuel Tank
The Command Pro has a larger fuel tank for longer run time. It also sports a debris screen, that allows for trouble free starting.

Larger Fuel Tank vs. Competitor

Heavy-Duty Air Cleaner

Heavy Duty Air filter

A heavy duty patented air cleaner is standard. It has an indexable cover that allows it to be rotated to capture warm air from the muffler and heat the carburetor air on applications that operate in both warm and cold weather conditions.



Warm Weather vs. Anti-Icing Configuration

Dual Ball Bearings

Dual Ball Bearings

The Command Pro has ball bearings on both ends of the crankshaft and a cast iron liner for a truly heavy duty, long life, commercial grade engine.

Other Features

Along with all of the other standard features, the Command Pro includes electronic ignition, Oil Sentry$_{TM}$ low oil protection, dual oil fill and drain locations, helical cut gears, and a 2 year warranty for commercial users.

Oil Sentry$_{TM}$ Protection

Dual Oil Fill

Helical Cut Gears

Courage Horizontal Utility

Kohler Enters Consumer Horizontal Market

The leader in commercial engine products is now manufacturing a line of horizontal consumer engines that has some of the same features as it commercial line.

The Slant cylinder overhead valve design engine line has a cast iron liner, dual ball bearings, water trap carburetor, and larger fuel tank (than competitive engines) which includes a serviceable debris screen, and it is all covered by a two year warranty.

Cast-Iron Liner

Cast-Iron Liner

This feature is standard on the entire Kohler consumer line of engines. With proper care this feature will extend the life of the engine.

Dual Ball Bearings

Dual Ball Bearings

This is a standard feature that does not appear on any of the competitive consumer engines. This feature sets the bar for the competition with a feature that is not always used on commercial engines.

Water Trap Carburetor

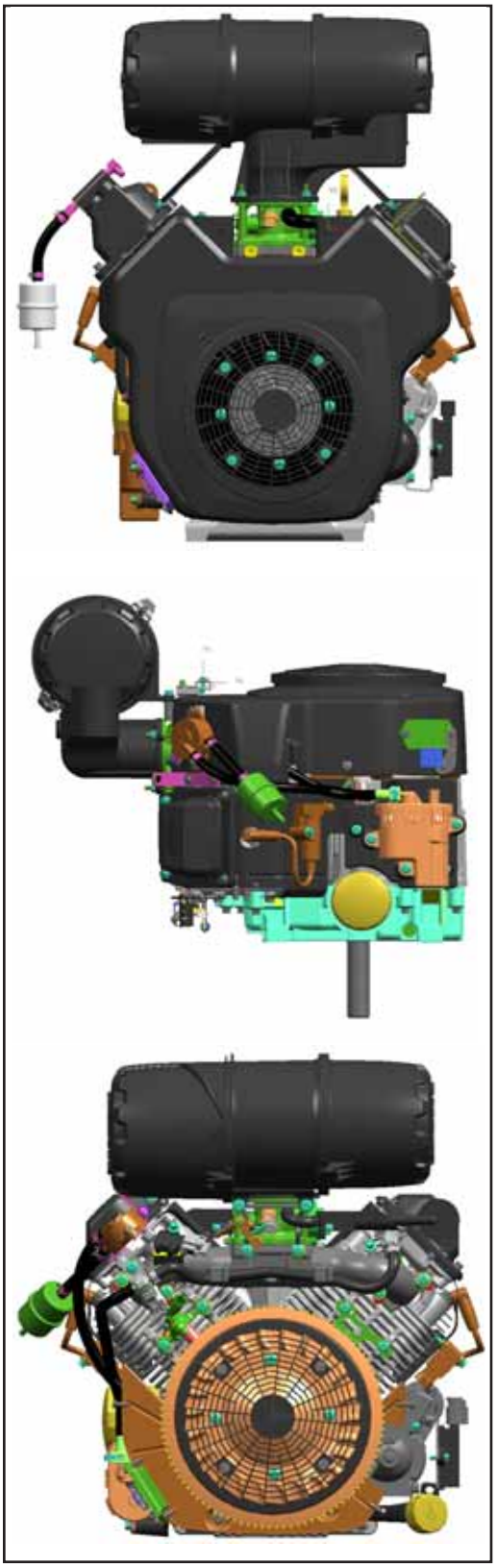
The water trap carburetor controls the moisture that can sometimes create a problem for getting these engines started when used on applications that sit for extended periods or when the fuels attract moisture.

Water Trap Carburetor

Large Metal Tank and Serviceable Fuel Screen

The tank is larger then any other offering from any manufacture in the consumer market. This increases the runtime. The tank screen is removable and allows for ease of service.

Metal Fuel Tank and Screen



Consumer EFI with Heavy-Duty Air Cleaner System

New Commercial EFI

Introducing the all new self-contained EFI system from Kohler Engines. This “Closed Loop” “Sequential Fuel Injection” system has all the advantages of the current system and more.

The self contained system means that all the previously added components are now mounted to the engine and include:

- Fuel Pump
- Fuel Pressure Regulator
- Electronic Control Unit

This makes mounting the engine as simple as any carburetor system without the need for a fuel return line.

Currently designed for Command Twins in both horizontal and vertical configurations as well as the Aegis horizontal the range covers from 19 to 41 HP engines.

The first model released will be the Command vertical 30 HP engine scheduled in April of 2009 with additional models available monthly through 2010.

“Green” world wide emissions compliance means these engines are designed to meet the stringent requirements of EPA, California, and European regulatory agencies, and will be done without the use of expensive catalytic or air induction systems.

A “Flex Fuel” option of up to E85 will be available in 6 to 9 months after the start of production.

Current EFI sensors include:

- Speed Sensor
- Engine Oil/Coolant Temperature
- Throttle Position Sensor
- Oxygen Sensor (Single Wire)

New Commercial EFI additional sensors include:

- Manifold Absolute Pressure (MAP) Sensor
- Air Inlet Temperature Sensor
- Oxygen Sensor (Heated 4 Wire)

Lower fuel consumption, depending on application load conditions, fuel savings are expected to be in the 15–30% range.

Courage XT-6

Courage XT-6

September 2007 marked a great milestone for Kohler Engines with the launch of our first ever engine for the consumer walk behind mower market.

Although the market has been slow, there are strong indications that sales will grow dramatically in this market as well as in the pressure washer and generator markets over the next few years.

September 2008 has marked another great achievement with the official launch of the new XT-6 engine models. The XT-6 engines are a lower horsepower version of the current XT-7 design and come equipped with all of the professional grade features you would expect from Kohler – overhead valve design, cast-iron cylinder bore, and a heavy-duty forged crankshaft. The XTR-7 engines are based on the XT-7 design but include premium, turn-key electric starters.

Smart-Choke™ Technology
Kohler is also adding to the easy-to-start features with the addition of Smart-Choke™. Smart-Choke™ is a feature that requires no priming before starting the engine. The user simply pulls the recoil to start. Smart-Choke™ is an option available on all models of XT-6 and XT-7. Our Smart-Choke™ technology is state-of-the-art and performs above the competition in all starting conditions.

With the addition of the XT-6 and XTR-7, Kohler now has a complete line-up of engines for the walk behind market.

Section 6 - Miscellaneous

Replace Mating Gears
It is recommended in situations where a broken crankshaft gear is replaced as a repair that the camshaft should also be replaced.

The mating gear will develop a wear pattern, and failure to change it may cause a repeat failure. This suggestion was submitted by a wily old distributor that has experienced this phenomenon many times over his long career. Refer to Service Bulletin 250 for further information.

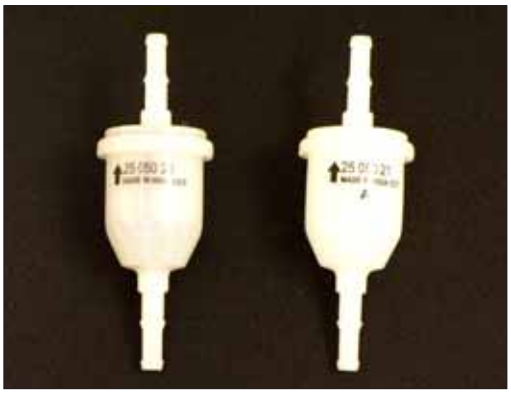
Avoid Repeat Failures

Erratic Running & Vapor Lock
It seems there has been some confusion in the field on which fuel filter to use as a replacement.

Part No. 25 050 22-S (51 microns) should be used on engines equipped with a fuel pump.

Part No. 25 050 21-S (75 microns) should be used on engines using gravity feed.

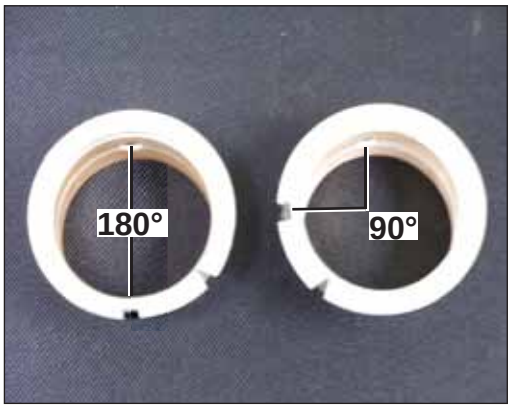
Although the fuel pump filter does a better job of removing debris from the fuel, it is also more restrictive and can cause erratic running and vapor lock when used on gravity feed systems. When in doubt, use 25 050 21-S for either type of system. Refer to PB-253 in “Bulletins, Etc.” for further information.



25 050 21-S Works for Both

Bearing Concern
There have been some bearings that are used on the KT and Magnum series engines that have been packaged incorrectly. The 52 030 10-S has an oil hole that is 90˚ from the aligning tab. The bearings that were found in the packages had oil holes that were 180˚ from the aligning tab.

This will cause problems with the lubrication characteristics of the bearing and will create a failure. If you have any of these bearings it can be handled with a new defective warranty claim. The packing date codes where the bearings were found are from **746** to **751**.



90° is Correct

Hours	Miles vs. RPM	
	1800	3600
1	40	80
8	320	640
100	4,000	8,000
200	8,000	16,000
500	20,000	40,000
2,000	80,000	160,000
3,000	120,000	240,000

Miles Traveled vs. RPM

Makes You Think...

This information came from a service bulletin written by an OEM in the mid '70's. Although there are many factors that play into the life expectancy of an engine, such as maintenance and care, the time factors and comparisons made in the bulletin make you think.

An engine that runs at **1800 RPM** for one hour is equivalent to a car run at 40 miles per hour for one hour.

An engine that runs at **3600 RPM** for 1 hour at *twice* the RPM is the equivalent to a car run at 80 miles per hour for 1 hour.

Most generator engine speeds vary in operation over any given period, so it is difficult to give this formula the precision it needs, but the numbers may open the eyes of a customer who does not give the equipment the required care it deserves.

A generator that operates under load for 100 hours is equivalent to 8,000 miles on a car. This equates to only running the engine for 2 hours per week over one year's time. A job site generator that is run 6 hours per day, 5 days per week for 52 weeks (depending on the load) would be the same as putting between 62,400 to 124,000 miles a year on a car.

What would the maintenance requirements be, versus what they actually receive? Makes you think.

OEM Parts

Ditch Witch® Dipstick

Through a recent agreement between Ditch Witch® and Kohler, a dipstick and oil fill tube not supplied by Kohler is being used. The two specs being used are 76640 and CH750-0032.

Because of the position of the engine and the unusual application, the oil fill tube and dipstick configuration were not available in our system. Due to the small volume of engines that use this configuration and the cost of designing a new dipstick and oil fill tube, it was not feasible.

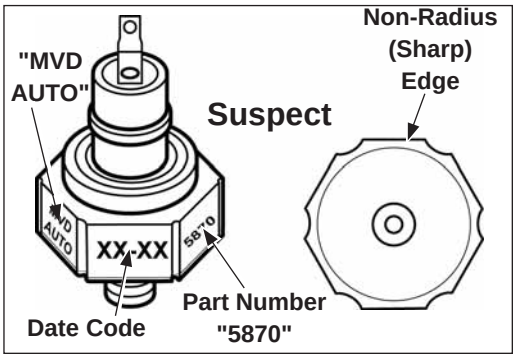
These parts will not appear on the parts drawing and the parts list will indicate "OEM supplied."

Who Left the Oil Lights On

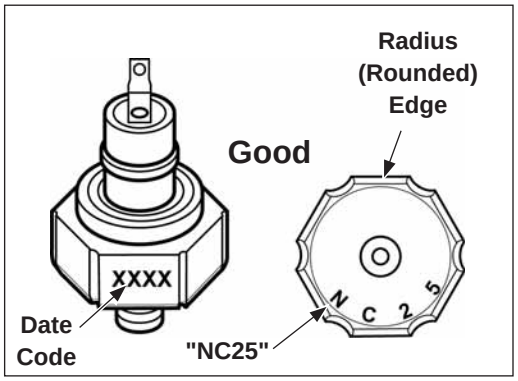
The Oil Pressure Switch, Part No. 25 099 27-S, was first introduced into production in January of 2008. We have been receiving scattered reports about the oil light turning on and not shutting off.

Service Bulletin 290 outlines details about the two manufacturers that build the switch and how to identify which one is failing.

The switches in question all have the date code **806**. If you have stock with this date code you may submit a warranty claim for “New Defective” using the authorization code **ME4292N**.



MVD Oil Pressure Switch



FAS Oil Pressure Switch

New/Reinstated Service Tools

Effective December 2008, the following tools will be added or reinstated to our current tool offerings. Contact your source of supply for further information.

Description	Part No.	Suggested List Price
OHC Timing Tool Set	28 761 01-S	$45.76
O.S. Valve Guide Reamer	25 455 12-S	$49.38
Reamer Handle	25 455 09-S	$25.88
Radiator & Cap Tester	25 455 10-S	$75.71

Pre-Emptive Action

Bearing Failures

Bearing failures can be easy to identify but extremely difficult to troubleshoot. One cause of lower bearing failure can be the result of electrolysis. No, it does not involve hair removal.

It is stray voltage attempting to seek an area to ground itself. In this case that area happens to be through the bearing. It uses the oil film to arc across the gap in the bearing causing pitting, scoring, and eventually failing the main bearing.

These are typically low hour failures, a key factor in what to look for. Although there are other causes for bearing failures this can be one of the more elusive and difficult problems to troubleshoot. The voltage could come from a source such as the clutch, or loose ground cable at the block.

For that reason we have attached some excerpts from an OEM bulletin giving a detailed outline of a test procedure used to check the clutch mechanism. The additional information reduces the potential for incorrect diagnosis, that may result in a repeat failure.

Kohler Service Bulletin 240 covers many of the tests that can be done to the clutch after it has been removed. Here is a test that can be done before you remove the clutch that might show a failure that won't show up when the clutch is removed.

1. Disconnect the tractor wiring from the battery.

2. Connect wire from the positive terminal of a fully charged battery to one of the clutch leads. Connect a second jumper (K) from the negative terminal of the battery to the other clutch lead. The clutch should engage.

3. With the jumpers still in place and the clutch engaged set a voltmeter to 12 volts DC. Attach the meter common lead to the battery negative terminal and probe the clutch with the meter VDC lead (L). Test various points on the clutch body. The meter should read zero. No voltage should be running through any part of the clutch. If any voltage is detected flowing through the mechanical parts of the clutch, the clutch must be replaced.

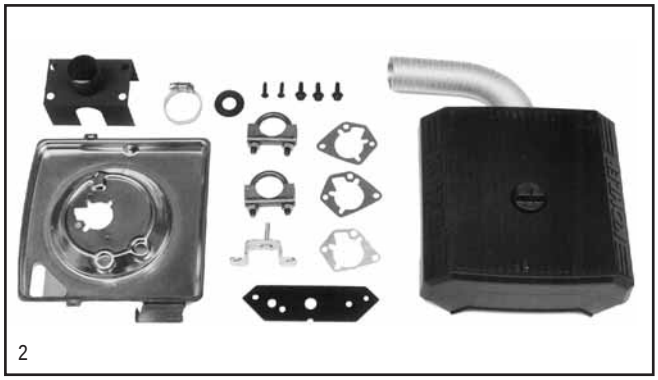
Anti-Icing Components

For applications that are used in warm as well as cold weather environments, we have some kits available to keep your engine compliant with CARB and EPA regulations while operating in cold weather.

Because of the closed breather system required by these regulations, some engines can develop icing when the temperatures reach the freezing point. Icing can affect the performance of the engine and in some instances cause it to run rich.

There are some temperatures however, that these kits are not effective at, and the engine should be converted back to the original configuration. This protects it in warmer temperatures and dirty environments. Listed are the engines and the kits that are available.

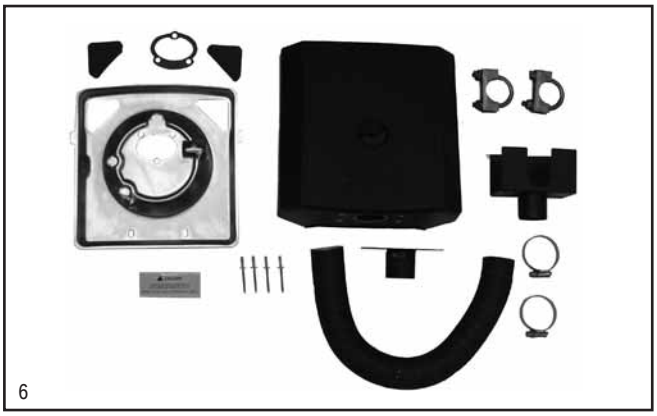
1


2

3

4

5


6

7

ANTI-ICING COMPONENTS

If the included instructions are followed, these kits/parts may be used without jeopardizing CARB/EPA certification on the engine.

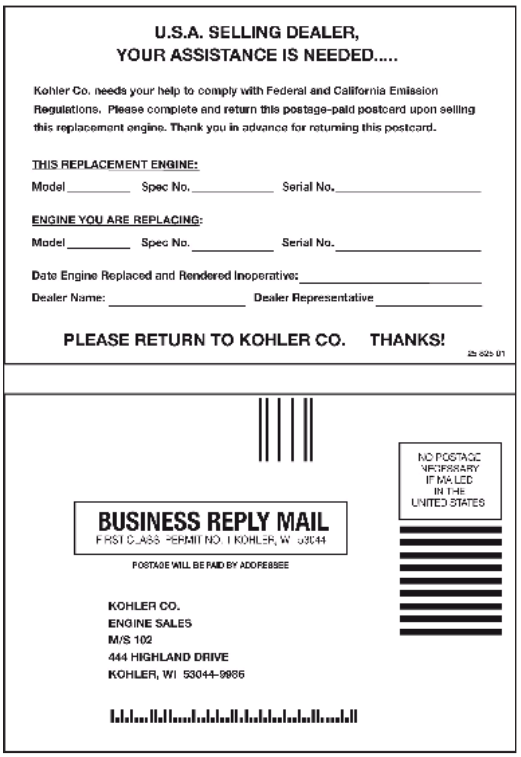
Kit No.	Model	As Low As	Notes	Heat From	Item
24 755 64-S	CH18-22	20°F	For PTO mufflers	Muffler	1 (shown)
24 755 65-S	CH25-26/730-745	20°F	For PTO mufflers	Muffler	1
24 755 68-S*	CH18-22	20°F	For side mufflers	Manifold	2 (shown)
24 755 69-S*	CH25-26/730-745	20°F	For side mufflers	Manifold	2
24 755 82-S	CH18-26/730-745	–20°F	Includes starter side muffler***	Muffler	3
24 755 83-S*	CH18-22	–20°F	Includes filter side muffler***	Muffler	3 (shown)
54 755 06-S**	CH/CV17-26/730-745	—	Not for comm'l. mowers	—	4
63 755 39-S	CS8.5-12	20°F	—	—	5
12 168 02-S	CH18-26/730-745	—	Foam insulation only	—	—
24 168 01-S	LH640-775	—	Breather hose insulation	—	—
24 755 165-S	CH750 w/Flat Air Cleaners	—	For side mufflers	Manifold	6
12 326 24-S****	CH11-15	—	Insulated breather hose	—	7

* Not for use on filter side of engine if equipped with oil cooler.

** Increases carb temperature approx. 13°F. Covers triangular holes (2) in blower housing. Remove above 45°F.

*** Tubes travel through mufflers to bring warm air to air cleaner.

****Replaces existing breather hose to prevent icing, or order insulation only and install over existing hose.



U.S.A. SELLING DEALER,
YOUR ASSISTANCE IS NEEDED.....

Kohler Co. needs your help to comply with Federal and California Emission Regulations. Please complete and return this postage-paid postcard upon selling this replacement engine. Thank you in advance for returning this postcard.

THIS REPLACEMENT ENGINE:
Model _____ Spec No. _____ Serial No. _____

ENGINE YOU ARE REPLACING:
Model _____ Spec No. _____ Serial No. _____

Date Engine Replaced and Rendered Inoperative: _____
Dealer Name: _____ Dealer Representative _____

PLEASE RETURN TO KOHLER CO. THANKS!

25 625 01

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 1 KOHLER, WI 53044

POSTAGE WILL BE PAID BY ADDRESSEE

KOHLER CO.
ENGINE SALES
M/S 102
444 HIGHLAND DRIVE
KOHLER, WI 53044-9986

Emissions Compliant Replacement

Replacement Engine Reminder

This is a reminder when replacing an engine you must check to see if the original engine is emission compliant. When re-powering a piece if equipment, it is required by U.S. law that a compliant engine be used if the original engine was EPA or CARB compliant.

The information regarding whether an engine is compliant or not can be found on the engine information tag located on the engine. Replacement engines, short blocks, and compliance component parts can be found in any of the engine parts look up formats.

When a non-compliant engine (PX engine) is used as a replacement it is required that the engine be registered. This card can be found in an envelope attached to the box. Complete the card with the information found on both engine ID labels and return it to Kohler using the postage paid card.

On engines that are not emissions compliant, a suitable compliant engine should be considered first as a replacement. If none exists, then a non-compliant engine can be considered.

There is also a card that comes with non-compliant engines. It is found inside the box. This card should be completed and retained for two years.

KOHLER

April 17, 2007

TO: All Servicing Dealers

RE: Sale of Replacement Engines

This is a follow up to a letter that was sent several years ago as a reminder of the responsibility as an engine manufacturer, Central Distributor, and Servicing Dealer when selling uncertified engines as replacements.

The U.S. EPA and the California Air Resources Board (CARB) allow the sale of engines that do not comply with the current emission regulations as "replacement engines" provided that:

1. The engine manufacturer has ascertained that no engine that would comply with the applicable regulations is available with the appropriate physical or performance characteristics to repower the equipment; and
2. The engine manufacturer or its agent takes ownership and possession of the engine being replaced or renders it inoperative; and
3. The replacement engine is clearly labeled with language approved by the regulatory agencies stating that it is a replacement engine and that is all it can be used for.

The European Union also allows the sale of replacement engines as long as the engine complies with the emission standards that the engine being replaced had to meet when originally placed on the market. The engine needs to be labeled as a replacement engine.

These "replacement engines" cannot be sold for use by an OEM in the production or manufacture of any new product. They are **only** to be used to satisfy service requirements.

Following are details intended to clarify what Kohler Co. is doing to comply with the requirements for sale of non-certified "replacement engines" and what we need from Central Distributors and Servicing Dealers.

1. PX Prefix and Record Keeping - All engines produced by Kohler Co. as basic service or replacement carry a PX designation prior to the specification number. The engine ID nameplate states that these engines are to be sold for export (to countries that do not have emission regulations) or replacement purposes only.

Note: OEMs who manufacture outside the U.S. and sell finished goods back into the United States, Canada, or the European Union must use compliant engines.

Kohler has implemented a program to satisfy the regulatory guidelines by attaching a tag to the spark plug and applying a plastic envelope with a postage-paid reply card enclosed to the exterior of each engine carton. Both cards ask for model and specification information of the replacement engine and the engine being replaced. It also asks for the date the engine being replaced was rendered inoperative. The *postage-paid card is to be returned to Kohler* for our records, and the *tag is to be retained at the dealership for a recommended two-year time frame,* in case the regulatory agencies

Letter Regarding Compliancy

Troubleshooting Electric Starters

In the years of warranty claims that have crossed our path, one of the items that stands out in our system is the number of warranty claims filed on electric starters that actually test good.

For that reason we have added two simple test procedures this year, one for the inertia starter and one for the solenoid shift starter. This will hopefully help prevent filing a claim on a good starter. The copies in this book are printed black and white, however full color copies are available on Kohler PLUS under **Service Literature > Associated Documents**.

Kohler Starting Circuit Test Procedure

Use attached sheet(s) for test procedures and insert results on this form.

Second test should be completed to either confirm first test results or after completing corrective actions.

Engine Model: _____ Date of Purchase: _____

Engine Specification: _____ Date of Test: _____

Engine Serial Number: _____ Operating Hours: _____

Battery Date: _____ Battery CA: _____

Battery CCA: _____

Ambient Air Temperature: _____

Initial Testing		Second Testing	
Step 1	_____	Step 1	_____
Step 2	_____	Step 2	_____
Step 2	_____	Step 2	_____
Step 4	_____	Step 4	_____
Step 4	_____	Step 4	_____
Step 5	_____	Step 5	_____
Step 6	_____	Step 6	_____

Description of what Corrective Actions were performed between Test 1 and 2
(list none if corrective actions were not needed)

Solenoid Shift Starting Circuit Test Procedure

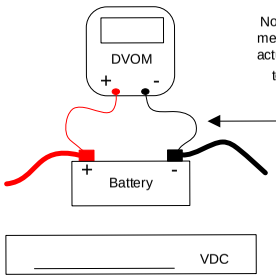
REV. 07/23/2008

Before Starting:

- Battery voltage should be tested and must be at 12.4 VDC or higher. **Do not proceed if battery voltage is less than 12.4 VDC as battery should be charged.**
- Test meter leads before use. (Set meter to Ohm's and check for resistance reading of less than 0.10 Ohm)
- If available, use clamping meter leads to assist with testing.
- Set meter to next highest voltage scale that includes 20 VDC.
- When taking readings, allow the meter to stabilize before recording. The reading should stabilize after 3 to 5 seconds. **If reading continues to drop while cranking, stop the test and perform a battery load test.**
- **Record Ambient Air Temperature:**_____

Step 1

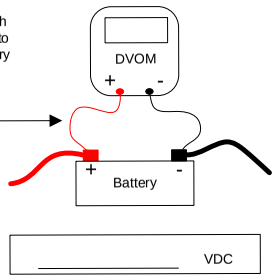
Test #1
Battery Voltage Test
(Static)



Step 2

Test #2
Voltage Drop Across Battery
(Cranking)

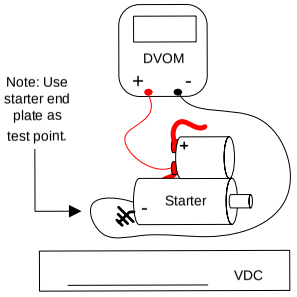
Note: Touch meter lead to actual battery terminal.



Step 3

Test #3
Voltage Drop Across Starter (Cranking)

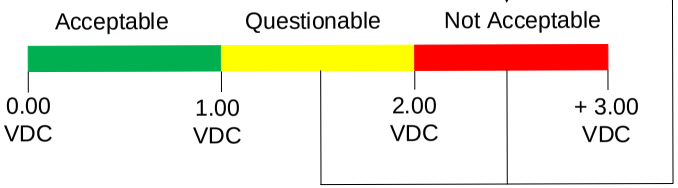
Note: Use starter end plate as test point.



Step 4

Test 2 – Test 3 = Voltage Drop in Electrical Path

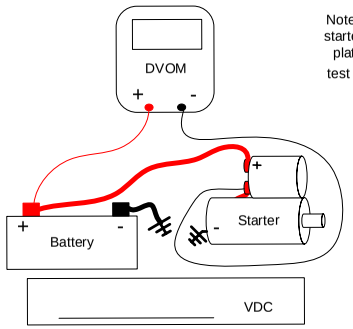
_____ VDC (Test 2) - _____ VDC (Test 3) = _____ VDC (Voltage Drop in electrical path)



Step 5

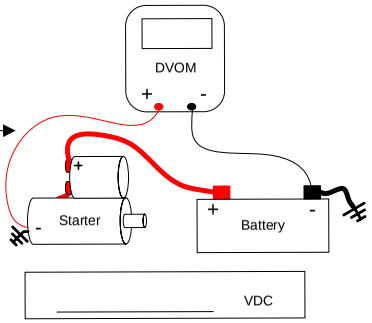
Test #4
Voltage Drop Across Positive Path
(Cranking)

Note: Use starter end plate as test point.



Step 6

Test #5
Voltage Drop Across Negative Path
(Cranking)



If the value for step 5 or 6 is greater than 50% of the difference in step 4 continue to Step 7. Otherwise the test is complete.

Step 7
Corrective Actions

- Inspect For Corrosion at Terminal Connections:
  Use a wire brush to clean the surfaces of the connections.
- Inspect All Crimped Connections:
  Tighten loose crimps or replace the connectors.
- Check and/or Replace Solenoid:
- Inspect All Cabling For Damage:
  Replace all damaged cabling.
- Inspect Wiring Cables for Correct Sizing:
  Use American Wire Gauge (AWG) or Society of Automotive Engineers (SAE) specifications for guidance.

Inertia Drive Starting Circuit Test Procedure

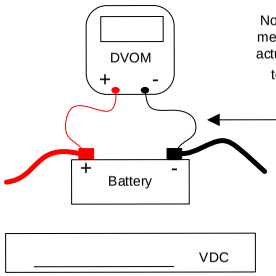
REV. 07/21/2008

Before Starting:

- Battery voltage should be tested and must be at 12.4 VDC or higher. **Do not proceed if battery voltage is less than 12.4 VDC as battery should be charged.**
- Test meter leads before use. (Set meter to Ohm's and check for resistance reading of less than 0.10 Ohm)
- If available, use clamping meter leads to assist with testing.
- Set meter to next highest voltage scale that includes 20 VDC.
- When taking readings, allow the meter to stabilize before recording. The reading should stabilize after 3 to 5 seconds. **If reading continues to drop while cranking, stop the test and perform a battery load test.**
- **Record Ambient Air Temperature:**_____

Step 1

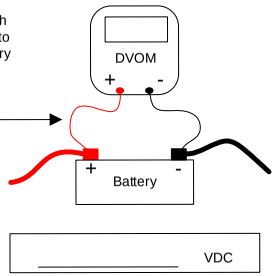
Test #1
Battery Voltage Test
(Static)



Step 2

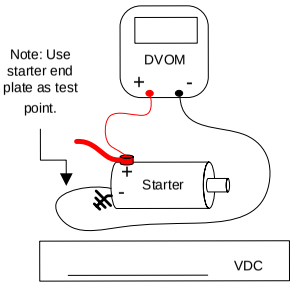
Test #2
Voltage Drop Across Battery
(Cranking)

Note: Touch meter lead to actual battery terminal.



Step 3

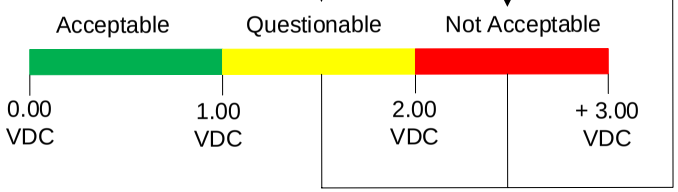
Test #3
Voltage Drop Across Starter (Cranking)



Step 4

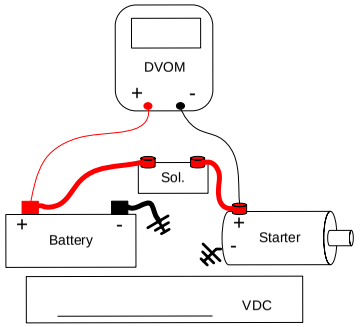
Test 2 – Test 3 = Voltage Drop in Electrical Path

_____ VDC (Test 2) - _____ VDC (Test 3) = _____ VDC (Voltage Drop in electrical path)



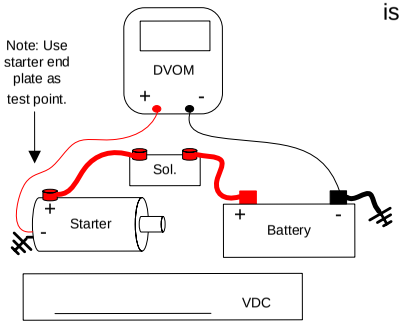
Step 5

Test #4
Voltage Drop Across Positive Path
(Cranking)



Step 6

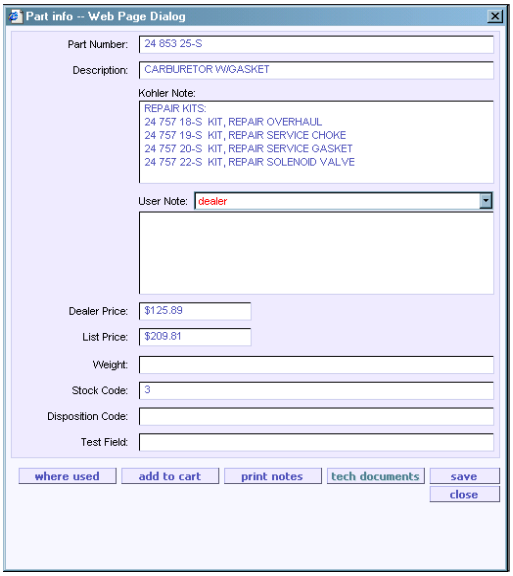
Test #5
Voltage Drop Across Negative Path
(Cranking)



If the value for step 5 or 6 is greater than 50% of the difference in step 4 continue to Step 7. Otherwise the test is complete.

Step 7
Corrective Actions

- Inspect For Corrosion at Terminal Connections:
  Use a wire brush to clean the surfaces of the connections.
- Inspect All Crimped Connections:
  Tighten loose crimps or replace the connectors.
- Check and/or Replace Solenoid:
- Inspect All Cabling For Damage:
  Replace all damaged cabling.
- Inspect Wiring Cables for Correct Sizing:
  Use American Wire Gauge (AWG) or Society of Automotive Engineers (SAE) specifications for guidance.



Carburetor Kit Shown in Part Information Box

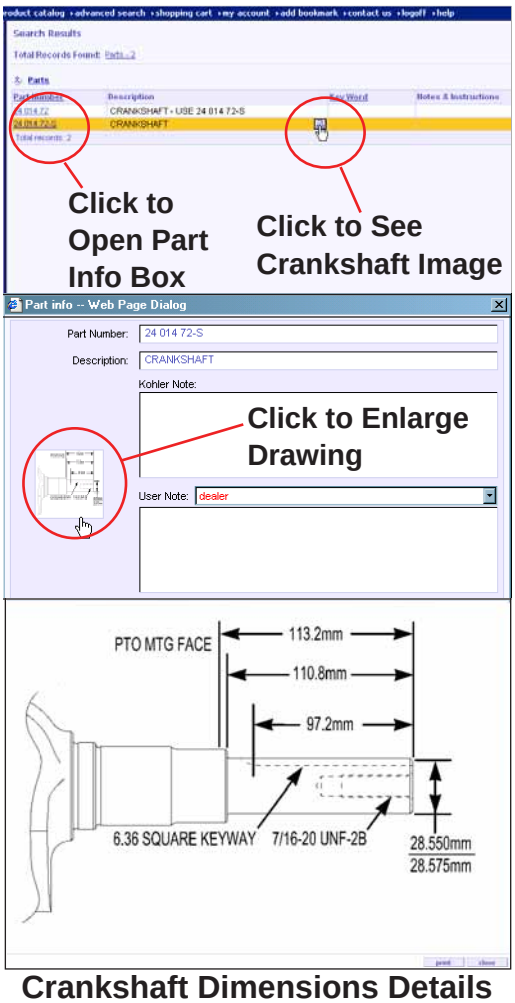
Kohler PLUS News

Carburetor Repair Kits in Kohler PLUS

Kohler PLUS has been improved to list the individual carburetor repair kits at the part level of the service carburetor.

You can:

1. Search by the XX 853 XX-S part number and bring up the search part information record to see the repair kits, or;
2. Click on the fuel system of a spec. Then click the notepad on the far right of the XX 853 XX-S carburetor kit part number.



Crankshaft Dimensions Details

Crankshaft Dimensions Now Available

Effective August 2008, you can now identify and compare your crankshaft easily in Kohler PLUS.

Just click on the part number to bring up the Part Info screen. The crankshaft dimensions will appear to the left of the description field.

Kohler PLUS Inquiries

When contacting us at engineparts@kohler.com always include your:

1. Company Name and Address
2. 9- or 11-Digit Warranty ID Number

Examples:
KW1234567 or 28950999999

This will help us to quickly process your request.

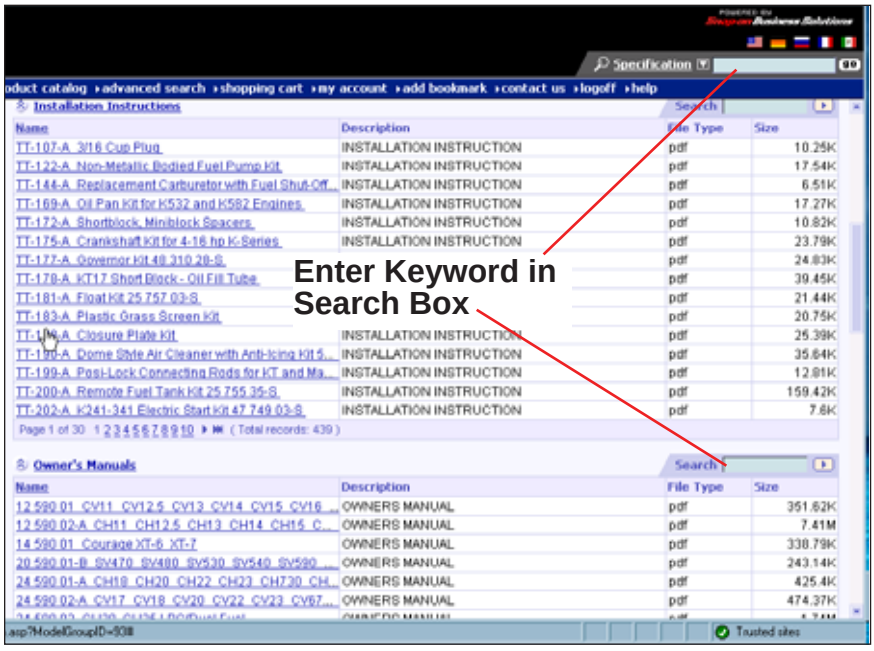
Searchable Literature Descriptions

Some recent changes to Kohler PLUS formatting include the ability to now search for a document by description instead of just the document part number.

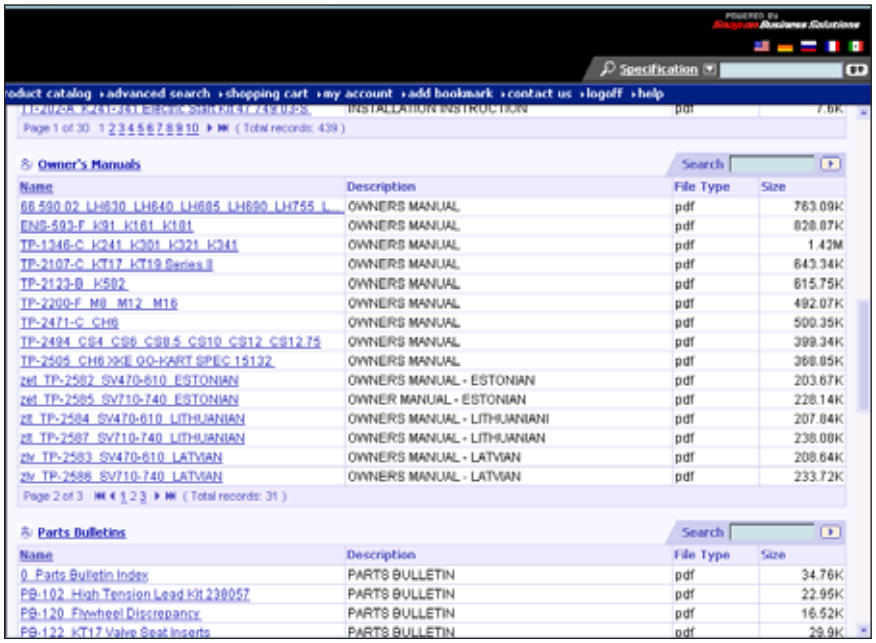
When searching for a document, just type a number, key word, or phrase into the search box for that section and click **"Go"** or hit the **"Enter"** key.

Kohler PLUS will sort the files and return a listing of only the documents that contain your search criteria.

A prefix has also been added to each translated document to enable easier document searches.



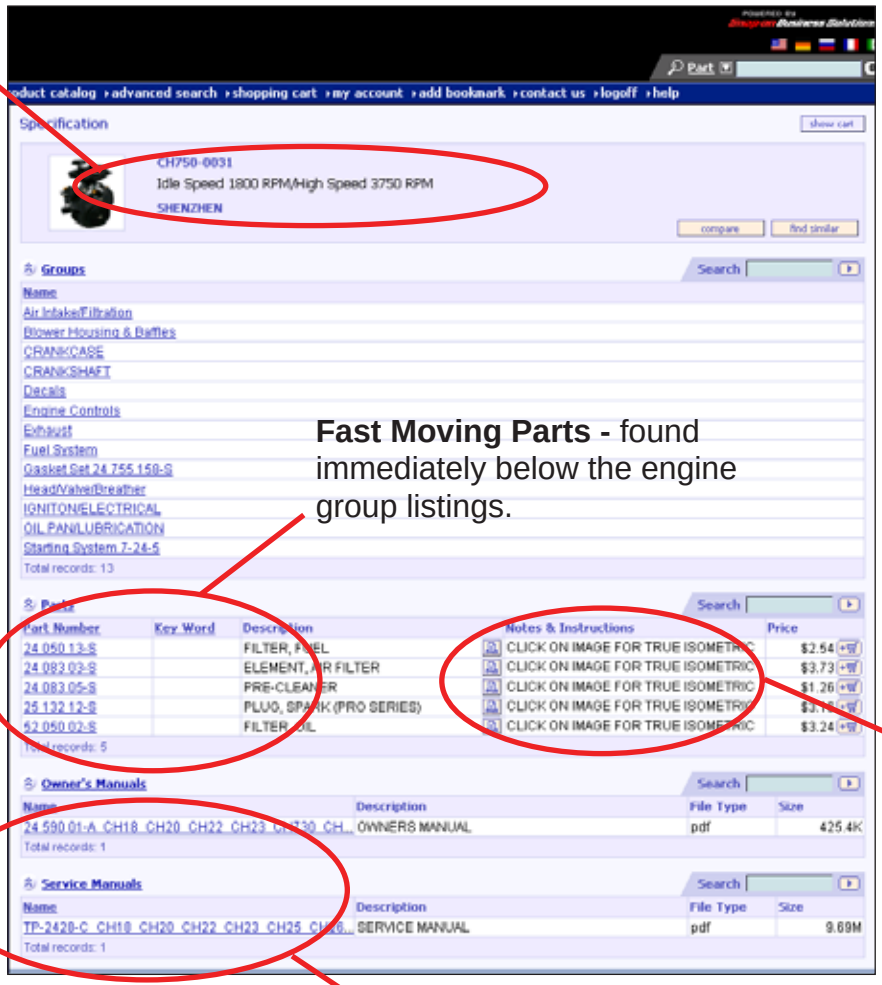
Descriptions Now Searchable



Prefix on Translated Documents

Other Enhancements Now Available

RPM Idle and High Speed Settings - located in the specification header.



Fast Moving Parts - found immediately below the engine group listings.

Click Here to View Image

Click Here to View Literature Relating to the Spec No.

***News Flash* on Kohler PLUS**

We are now posting all new released literature into one location initially on Kohler PLUS. You can find these documents located under the “News Flash” symbol, as shown to the left.

This section includes all NEW Service Bulletins, Parts Bulletins, Installation Instructions, Technical Flashes, Tech Tips, etc. The literature will be posted here for one month. We will also continue to post information under their specific headers. This will allow you the ability to stay current on new information.

Expanding the limits of power.

Factory Schools 2008-2009

Level I

The Level I course is designed to provide students with a working knowledge of Kohler four-cycle engines and engine systems. It is assumed the students will have a basic understanding of small gasoline engines upon enrolling in the class.

Information covered will include:

- Using Parts and Service Manual
- Use of Measuring Instruments
- Ignition/Electrical Theory
- Warranty Information
- Troubleshooting
- Failure Analysis
- Fuel Systems
- Engine Tear Down/Reassembly

Level I School Dates:

- August 4-8, 2008
- January 5-9, 2009
- August 3-7, 2009

Level II

The Level II course is designed for students who have completed a Level I course at Kohler, at a central distributor, or have passed the Kohler Expert Dealer Test. The class size is smaller to allow for more one-on-one instruction and hands-on activities.

Information covered will include:

- Electrical Systems – Ignition, Starting, Charging
- Fuel Systems – Gasoline, EFI, Gaseous
- Advanced Failure Analysis
- Tear Down and Reassembly Procedures
- Hands-On Diagnosis and Troubleshooting in a Variety of Areas

Level II School Dates:

- January 26-30, 2009
- March 2-6, 2009

Classes are filled on a first-come, first-served basis.
Submit your registration soon!
If you have any questions regarding registration, please give us a call at 920-451-4428.

KOHLER.

Kohler I.D. No. _____ Date of Application _____ E-mail _____

Company Name _____

Company Address _____ City _____ State _____ Zip _____

Business Telephone Number (_____) _____-_____ Fax Number (_____) _____- _____

Name of Applicant _____ Home Address _____

City _____ State _____ Zip _____ Telephone No.(_____)_____- _____

Years of Industry Experience (Minimum 1 Year) _____ ☐ Expert Dealer ☐ Authorized Dealer ☐ Certified Technician ☐ Specialized Dealer ☐ Other _____

A check, money order, or credit card must be received with the application to reserve a place in the class. Class fees include the following:

- Lodging (if needed) Sunday evening through Friday morning. *Long distance calls, and any in-room services are additional and will be payable to the hotel/ motel upon checkout.*
- Lunch and Breakfast, Monday through Thursday.
- Transportation to and from classroom.
- Instructional materials.
- Thursday evening Awards banquet.
- Framed diploma and uniform patches.
- Factory tour (Friday morning).

Choice of Dates:

1st Choice: _____

2nd Choice: _____

Please Check Room Preference:

☐ 4-Day Training Only (No Room Needed) - **$250.00** per person
☐ Single Accommodations - **$600.00** per person
☐ Double Accommodations - **$450.00** per person (When two students attend from the same company)

Equipment & Engine Training Council
WE SUPPORT EETC TECHNICIAN CERTIFICATION

You will be contacted with the school date choice(s) you have been accepted into once payment and registration are complete.

Make checks payable to “Kohler Co.” Make sure to reference “Factory School” and the month chosen in the memo section.

For credit card payment please fill out the following information:

Check One: ☐Master Card ☐Visa ☐Discover ☐ American Express

Name: _____
(Please print as it appears on credit card):

Account Number: _____

Expiration Date: _____

Telephone Number: (_____) _____-_____

Fax the completed application to us at 920-459-1743.

If paying by check or money order, please mail the completed application and payment to address below:

Kohler Co.
Engine Division
School Reservations, MS 095
Kohler, WI 53044

KOHLER®

Section 7 - Warranty News

Warranty System NOW AVAILABLE

The Kohler Engine Division is pleased to announce the start of a new era. Our new Web-Based Warranty Processing System is now available.

This Web-Based Warranty System will provide users the capability to submit their own warranty claims, track progress of a warranty claim, and view their own dealership claim history.

Coupled with faster reimbursement, our new system will even provide the opportunity for a dealership to submit engine registration for the customer and print reports, such as the warranty claim reimbursement detail.

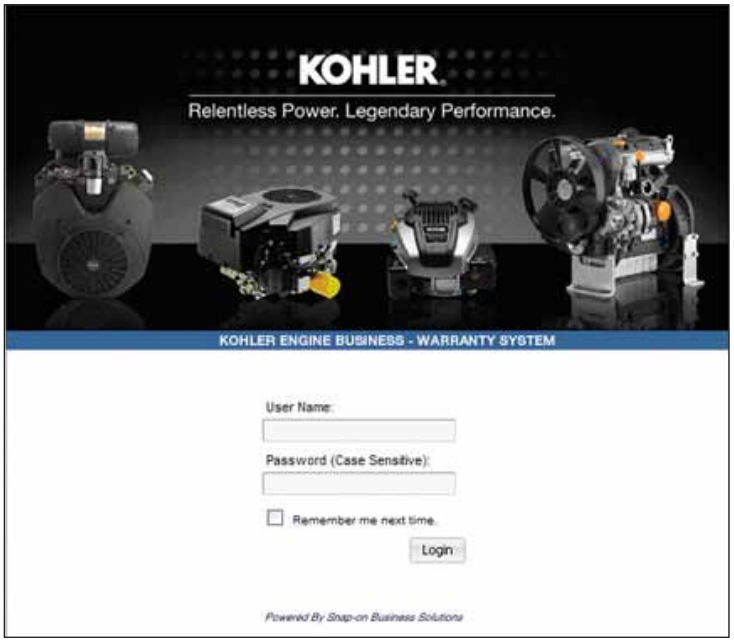
- To gain access to the system will require a USER Account be set up for you. Please contact your local CD representative, or call 866-255-9220. An individual user account will then be set up based on information provided by you. Each user will be requested to provide a special users name, password, position title, e-mail address and the First, Middle and Last name of the user.

- To access the new system via the Internet use the following address:

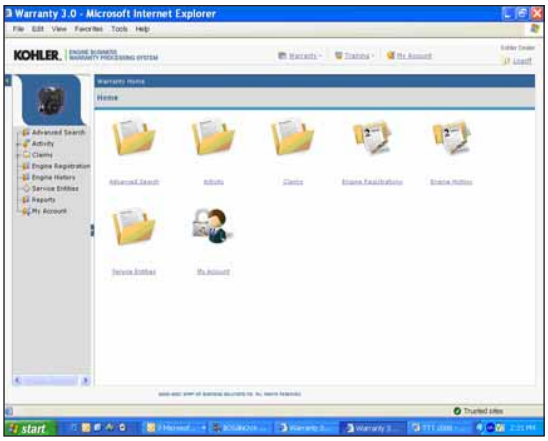
  www.enginewarranty.kohlernet.com

- Training Manual is available ON-LINE

- Advantages
  - Easy to Use
  - Faster Payment
  - Increased Accuracy
  - Review Engine History by Serial Number
  - Review Dealership Information
  - Engine Registration

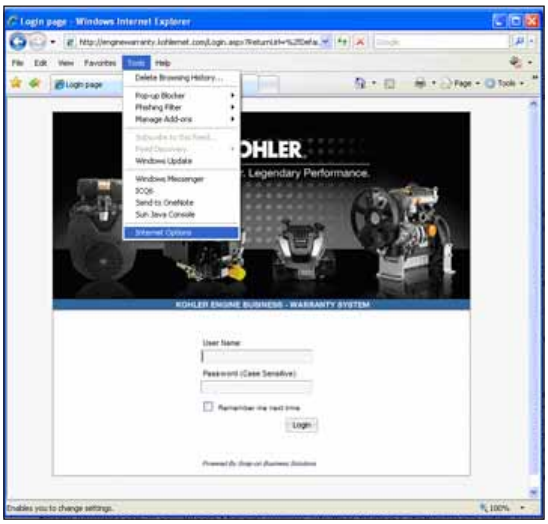


Login Screen



Warranty Home Page

After entering the system you will see the Warranty Home Page.

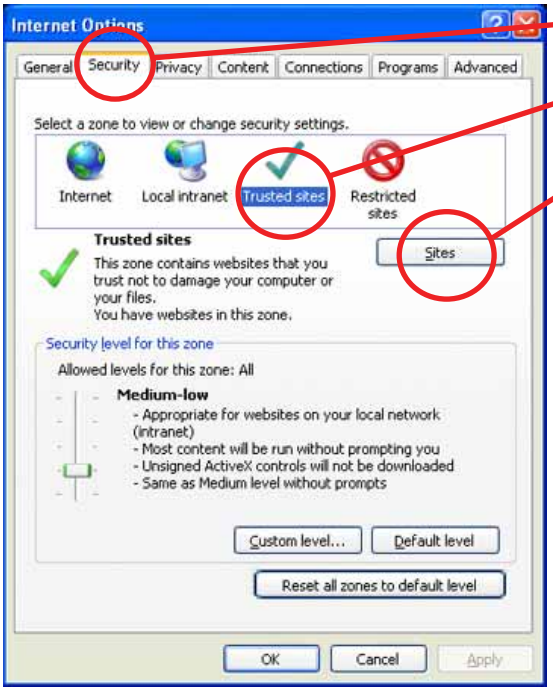


Click “Tools” Menu

Trusted Site Direction

If you encounter a problem while entering a warranty claim, always check that your computer identifies the Warranty System as a “Trusted Site.” Use the following step-by-step instructions to verify and change settings if necessary.

1. Open **Internet Options** from Internet Explorer by clicking on **Tools > Internet Options**.



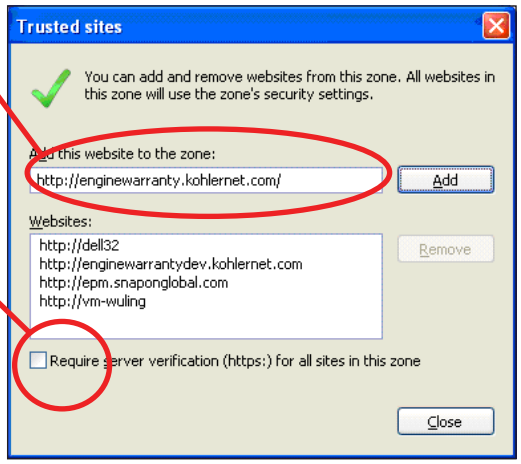
Security Tab

2. Click the **Security** tab.
3. Select the **Trusted Sites** icon.
4. Click the **Sites** button.

5. Type the warranty site web address and press the **Add** button.

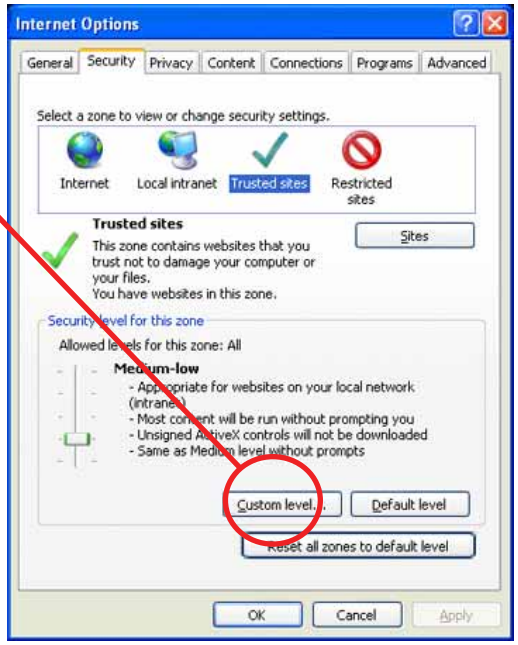
6. If the check box by **Require server verification (https:) for all sites in this zone** is selected, remove the check mark.

7. Click the **Close** button.



Enter Warranty as a Trusted Site

8. Click the **Custom Level...** button; the Security setting window will open.



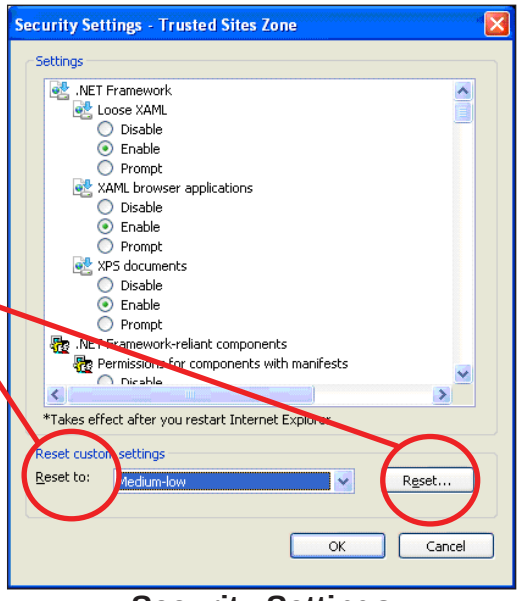
Changing Custom Level

9. From the Internet Explorer Menu, click **Tools > Internet Options**, then click the **Security** tab.

10. Change **Reset to:** to “Medium-Low.”

11. Click **Reset,** confirm your choice, then click **OK**.

11. Click **OK** at the Internet Security Properties dialog.



Security Settings

Helpful System Tips

- To use the system, all users must obtain a User Account to gain access. Contact your local CD or call the User Account Hot Line at 1-866-255-9220.

- Before using our new warranty system, please verify that your computer identifies the warranty system URL address as a trusted site.

- The user name and password for Kohler PLUS and the new warranty system are typically *not* the same or shared.

- When entering a warranty claim always provide the engine serial number whenever possible.

- When entering the part number for the defect or replacement part, you must always use spaces and (-S) as required. **Example 24 584 10-S.**

- To enter labor in the labor operation section click the (**+ Add Labor**) button.

- After entering labor hours you must select the **Enter/ Exit** button identified by two arrows to exit the labor field.

- Please be aware that just selecting the flat rate code does not populate the requested labor field. ***You must enter your labor amount in the (Requested Labor) section***.

- To enter replacement parts always select (**+ Add Parts**) button.

- Always close sections by selecting the **Enter/Exit** button which can be identified by the two rotating arrows.

- We prefer that you attach freight bills to the electronic warranty claim, but they can be faxed to 920-459-1743 if needed (please include the claim number on each one).

- When submitting a warranty claim always use the **Action** button. Use **Submit** for all normal warranty repair claims. Use **Request Pre-Authorization** for warranty claims requiring Central Distributor pre-approval, and **Request Engine/Short Block Review** for claims requiring Central Distributor representative approval of a short/block or engine approval.

EWR Review (Engine Warranty Return)

If you have ever dealt with a difficult warranty situation, you may occasionally have asked yourself how you resolve the problem and who you should go to for help. The following steps outline the procedure required to speed up the painful process.

The EWR (Engine Warranty Return) program is designed to determine the root cause of a failure or concerns that occur in the field. The process for warranty approval for engines and short blocks still begins with your Kohler representative or Central Distributor, but features in the new warranty program enhance the process.

The new warranty program features an auto-generated system which creates a number incorporating the warranty claim number and the EWR number for tracking purposes and quick resolution. This process automatically assigns an EWR number for engines or components that fit a criteria predetermined by the warranty department. This may include serial numbers, part numbers, or other factors that flag a particular concern.

There is some flexibility in the EWR program which allows the Kohler service specialists the ability to assign a 4-digit number to a dealer for engine or component returns. The 4-digit number is a means of tracking progress on an engine or component returned for examination.

Sending in an Engine or component without authorization to the warranty department will cause delays in processing. Become familiar with the following guidelines to help with this process.

EWR Why?

1. Issued by factory for the return of engines or components with the purpose of determining root cause of failures or concerns.
2. Insures improved quality and early warning for potential problems/trends in the field.
3. Assures returned engines or components are properly routed internally to Warranty, Engineering, Quality, or Vendors for timely analysis.
4. Disputed Warranties - Allows customers to request analysis and final decision by Factory.

EWR Caution

Engines or components returned to Kohler *without prior authorization and a visible EWR* number have an extremely high risk of being lost or destroyed.

It is the Dealer and Kohler Representative's responsibility to first make a valid effort to determine the cause of failure before requesting an EWR and analysis by Kohler Engines.

Engines or components returned without requested information may result in time delays as well as non-payment.

EWR When?

EWR is issued after a Dealer or Kohler Representative have examined engine or component and:

- are unable to determine the root cause of failure in relationship to defects in workmanship or material.
- the customer disputes the findings of Dealer and Kohler Representative and requests a final analysis by the Factory.
- the component may have a defect, and require additional examination by the factory.
- the factory may require clarification for warranty purposes.

EWR How?

1. After examining and analyzing a failed engine or component, Dealer or Kohler Representative must contact Kohler Factory Field Service with details of the failure and supporting information.

2. Field service will establish a call record, and supply an EWR number for return of engine or components.

3. The requester of the EWR (Dealer or Kohler Representative) will package engine or component and display the assigned EWR number prominently on two outside locations of packaging.

4. The requester of EWR will contact Shipping Company for pickup of failed Engine or Component and arrange for shipping to Kohler.

5. This Shipping Company may be specified by Kohler in certain cases.

6. Engine or components are to be shipped to:

   KOHLER ENGINES
   444 Highland Drive
   Building 607
   Kohler, Wisconsin, USA 53044
   Attn: Specified Individual

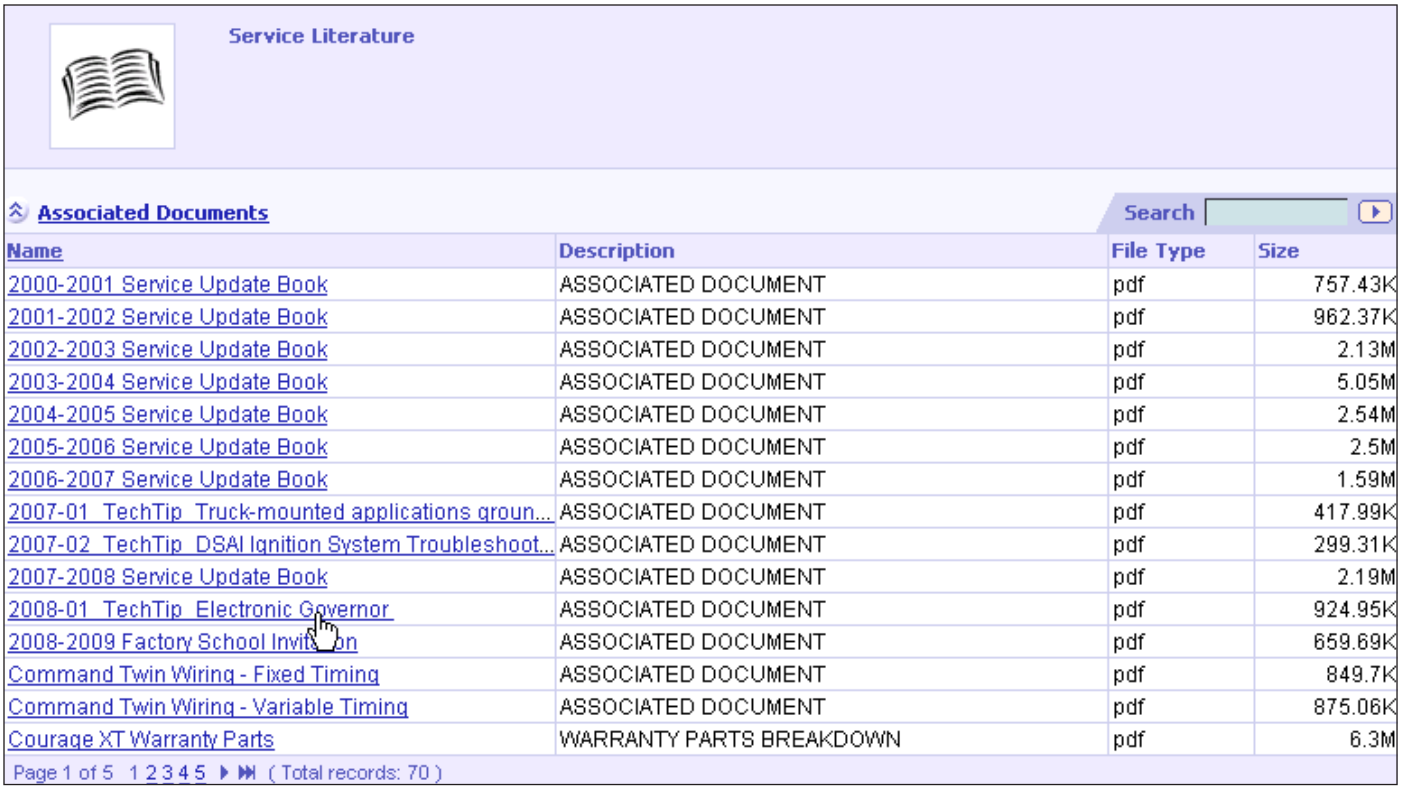
EWR Required Information

- Customer Information
- Date of Purchase (DOP)
- Dealer Information
- Engine Specification
- Engine Serial Number
- Engine Hours
- OEM Application
- Supporting Information
- Call Reference Number

Section 8 - Bulletins, Etc.

Beginning this year, we will include every Bulletin, Technical Flash, and TechTip released throughout the past year in this section. This allows you an easier, one stop reference point.

In addition to the Update Book, these documents will always be posted on Kohler PLUS under "Associated Documents."



Service Literature

Associated Documents

Search

Name	Description	File Type	Size
2000-2001 Service Update Book	ASSOCIATED DOCUMENT	pdf	757.43K
2001-2002 Service Update Book	ASSOCIATED DOCUMENT	pdf	962.37K
2002-2003 Service Update Book	ASSOCIATED DOCUMENT	pdf	2.13M
2003-2004 Service Update Book	ASSOCIATED DOCUMENT	pdf	5.05M
2004-2005 Service Update Book	ASSOCIATED DOCUMENT	pdf	2.54M
2005-2006 Service Update Book	ASSOCIATED DOCUMENT	pdf	2.5M
2006-2007 Service Update Book	ASSOCIATED DOCUMENT	pdf	1.59M
2007-01_TechTip_Truck-mounted applications groun...	ASSOCIATED DOCUMENT	pdf	417.99K
2007-02_TechTip_DSAI Ignition System Troubleshoot...	ASSOCIATED DOCUMENT	pdf	299.31K
2007-2008 Service Update Book	ASSOCIATED DOCUMENT	pdf	2.19M
2008-01_TechTip_Electronic Governor	ASSOCIATED DOCUMENT	pdf	924.95K
2008-2009 Factory School Invitation	ASSOCIATED DOCUMENT	pdf	659.69K
Command Twin Wiring - Fixed Timing	ASSOCIATED DOCUMENT	pdf	849.7K
Command Twin Wiring - Variable Timing	ASSOCIATED DOCUMENT	pdf	875.06K
Courage XT Warranty Parts	WARRANTY PARTS BREAKDOWN	pdf	6.3M

Page 1 of 5 1 2 3 4 5 (Total records: 70)

KOHLER ENGINES

Parts Bulletin

NO.	251
MODEL	Walker CH26
DATE ISSUED	7/07
DATE REVISED	1/08

New EFI Long Block for Walker CH26

A new CH26 EFI long block, part number **24 523 01,** is now available for servicing Walker CH26 model engines.

This long block consists of an assembled crankcase/closure plate (including all internal components) with the cylinder heads, valve covers, breather, and the throttle body/intake manifold assembly installed. A new oxygen sensor and new fuel injectors w/o-rings are included, but not installed. Simply transfer the wiring harness, ECU, starter, and all other external components.

As Walker specs are powered off the flywheel side only, a stub PTO side crankshaft which ends at the closure plate is installed. See Figure 1.

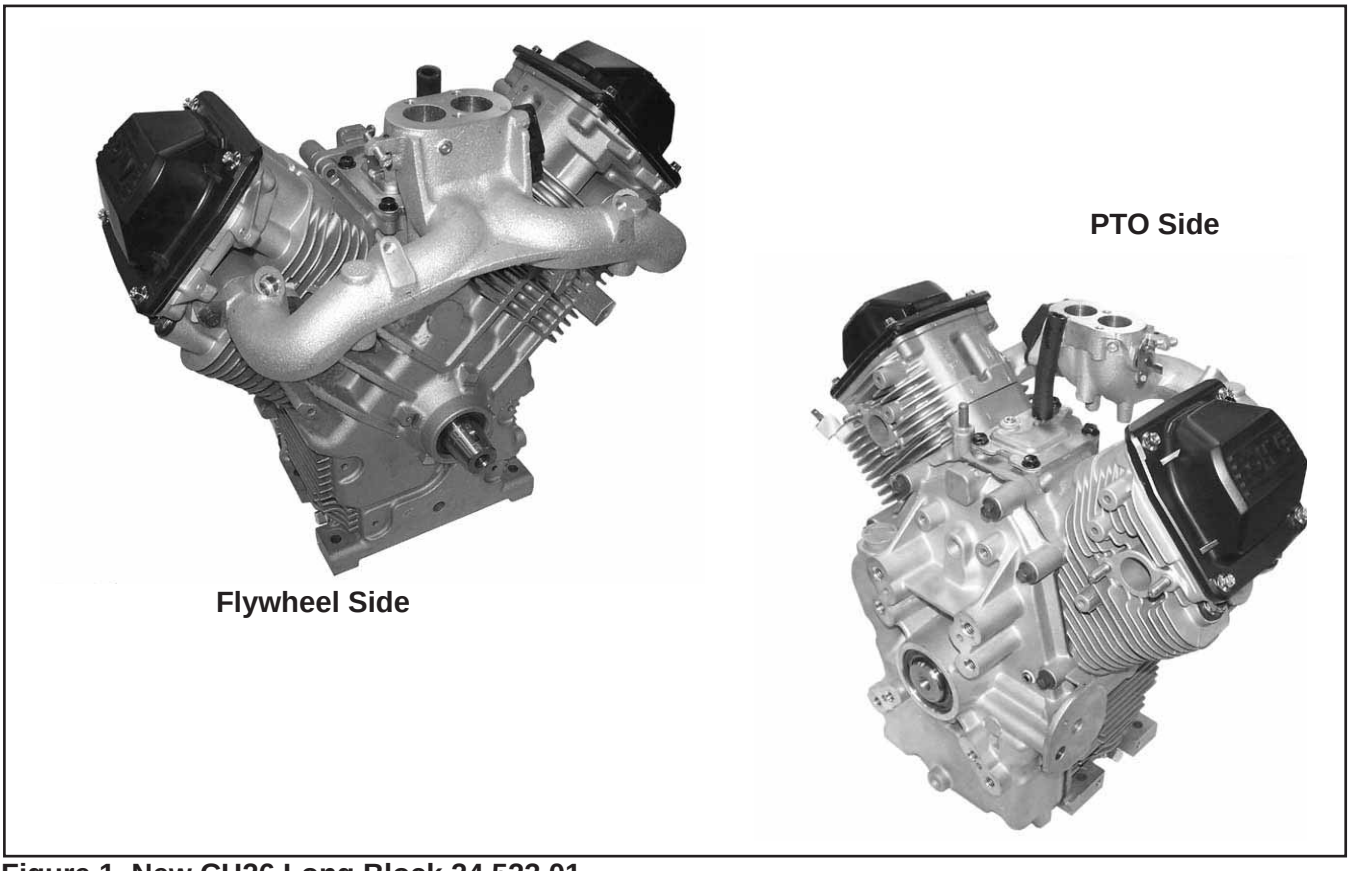


Figure 1. New CH26 Long Block 24 523 01.

This long block provides a significant cost-saving alternative over a complete EFI replacement engine.

The 24 523 01 long block is backed by a one-year limited warranty, and available from your normal source of supply.

KOHLER ENGINES

Parts Bulletin

NO.	253
MODEL	Some CH/CV/SV Twins and Singles
DATE ISSUED	10/08
DATE REVISED	

Correct Fuel Filter Selection

This bulletin has been created to provide clarity in selecting the correct fuel filter used with some CH/CV/SV Twins and Singles. Several fuel filters were used on these engines. Two of the filters used appear identical. The filters have different micron ratings and are not interchangeable. Failure to use the correct filter can result in difficult starting, poor engine performance, and damage to the fuel system.

Part number **25 050 21-S** is used with **gravity feed systems** and has a 75 micron filtration grade.
Part number **25 050 22-S** is used with **fuel pump systems** and has a 51 micron filtration grade.

Fuel System Identification

Part number **25 050 21-S** is used on gravity feed systems. Fuel flows from the tank through the fuel filter and into the carburetor. See Figure 1.

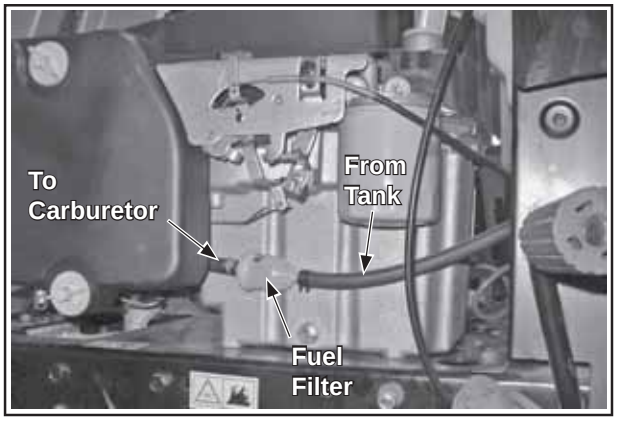


Figure 1. Gravity Feed Model.

Part number **25 050 22-S** is used on fuel pump systems. Fuel is drawn from the tank to the fuel filter and into the carburetor. See Figure 2.

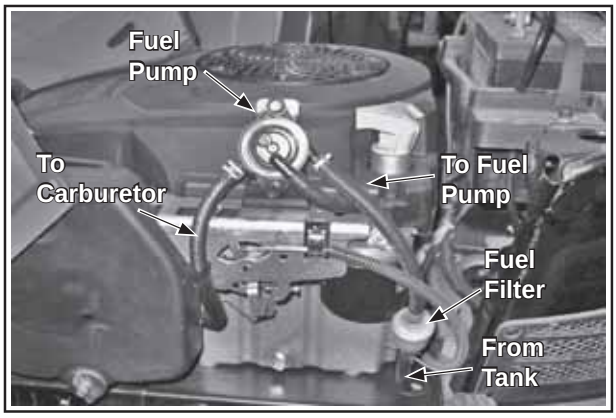


Figure 2. Fuel Pump Model (Fuel Pump May Be Mounted Outside or Inside the Blower Housing).

Fuel Filter Identification

The two filters used appear identical. The part number is printed on the side of the filter. See Figure 3.

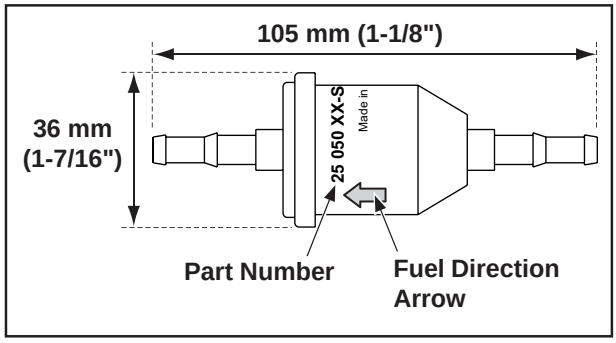


Figure 3. Fuel Filter.

Fuel Line Installation

Slide the hose clamp 38 mm (1-1/2") past the end of the fuel line. Slide the fuel line onto the fuel filter and completely over the barbs. Slide hose clamp over the fuel line as shown. See Figure 4.

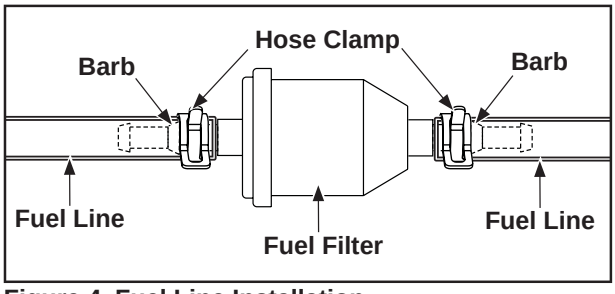


Figure 4. Fuel Line Installation.

KOHLER ENGINES

Parts Bulletin

NO. 254

MODEL SV470-SV620

DATE ISSUED 10/08

DATE REVISED

Short Blocks for Courage Single Cylinder Engines

For model year 2009, the Courage single-cylinder engines will incorporate a new balance system and common bore size. Our plant in Hattiesburg, MS converted their operation and started building engines with the new configuration on September 16, 2008. Due to the conversion of their assembly line, short blocks will also now be built with the new configuration. The new short blocks will service all engine configurations, both new and old. However, in order for the engine to remain emission compliant, the new short blocks for SV470-SV540 engines will include a matching carburetor, which **must** be installed as part of the repair.

When ordering a short block for a Courage single, please refer to the table below to identify the correct part number to be ordered. For models SV470-SV540, it will be necessary to identify the type of fuel system on the original engine, either gravity flow (no fuel pump), or pressure flow (has fuel pump).

Engine Model	Fuel System Type	Short Block to Order
SV470/480	Pressure flow	20 522 08
SV470/480	Gravity flow	20 522 09
SV530/540	Pressure flow	20 522 10
SV530/540	Gravity flow	20 522 11
SV590/600	All	20 522 05
SV610/620	All	20 522 07

KOHLER ENGINES

Service Bulletin

NO.	285
MODEL	SV470-SV620 SV710-SV840
DATE ISSUED	3/07
DATE REVISED	3/08

Loose/Cracked Flywheel Ring Gears

Powdered metal style ring gears were introduced on Courage series engine flywheels beginning in 2006. Due to isolated cases of failure, we have made a change from powdered metal ring gears to steel ring gears.

If you have a situation of the starter engaging but not cranking the engine over on a unit within the serial numbers listed, check to see if the ring gear has cracked and separated (see Figure 1).

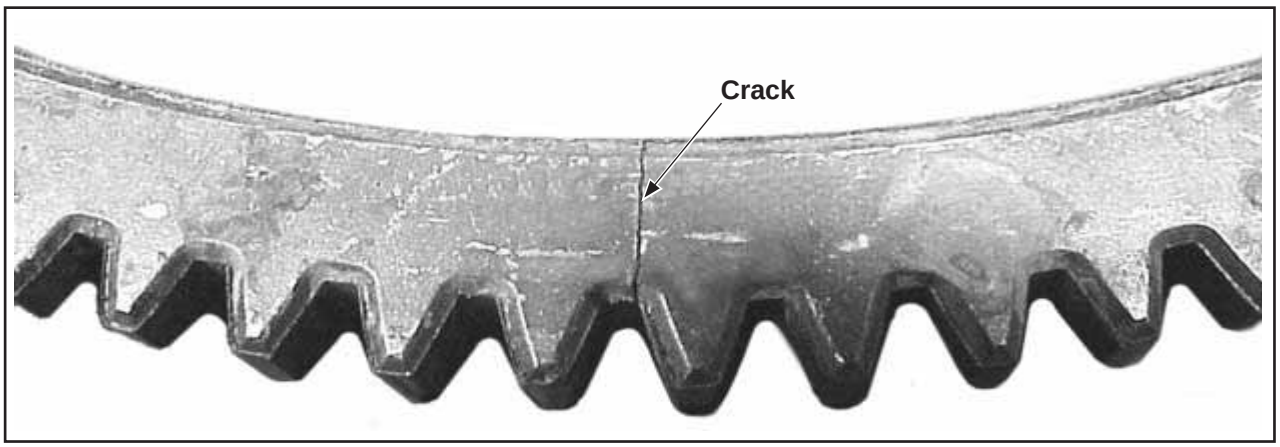


Figure 1. Example of Cracked Flywheel Ring Gear.

SV470-SV620 engines between **Serial Numbers 36142xxxxx and 3807030423,** and SV710-SV840 engines between **Serial Numbers 36142xxxxx and 3806308723,** were built with a steel or a powdered metal ring gear.

Replace the flywheel on any unit where this has occurred, as the ring gear is not serviced separately. At the same time, inspect the starter pinion for any damage and replace it as required. Normal warranty terms will apply.

KOHLER ENGINES

Service Bulletin

NO.	287
MODEL	SV710-SV840
DATE ISSUED	12/07
DATE REVISED	10/08

Crankcase Oil Overfill (Revised 10/2008)

We have received reports of intermittent smoking on Courage Twin engines. The majority of these cases are due to overfilling the crankcase. Overfilling can be eliminated by properly checking oil level. If the oil is checked with the oil fill cap/dipstick improperly set on the oil fill tube, the crankcase may be overfilled by up to 10 ounces of oil. Detailed oil level checking instructions are outlined below. Additionally a decal showing the correct oil cap/dipstick position may be ordered. Part number: **32 113 60-S.**

Checking Oil Level

The importance of checking and maintaining the proper oil level in the crankcase cannot be overemphasized. Check oil before each use as follows:

1. Make sure the engine is stopped, level, and cool so the oil has had time to drain into the sump.

2. Clean the area around and the under side of the oil fill cap/dipstick before removing it. This will help to keep dirt, grass clippings, and other foreign matter out of the engine. See Figure 1.

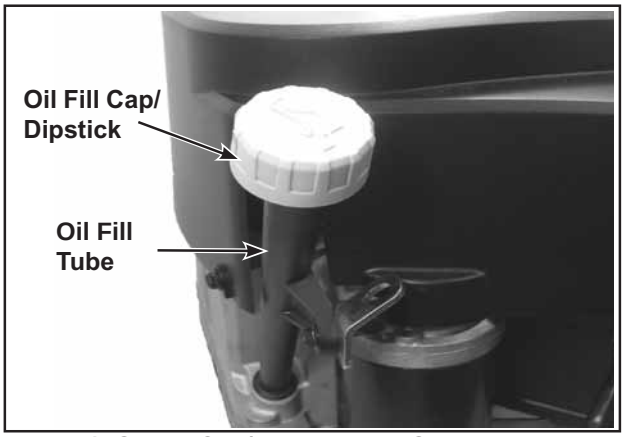


Figure 1. Oil Fill Cap/Dipstick and Oil Fill Tube.

3. Unthread and remove the oil fill cap/dipstick; wipe off oil. Reinsert the dipstick into the oil fill tube and thread the dipstick in completely. See Figure 2.

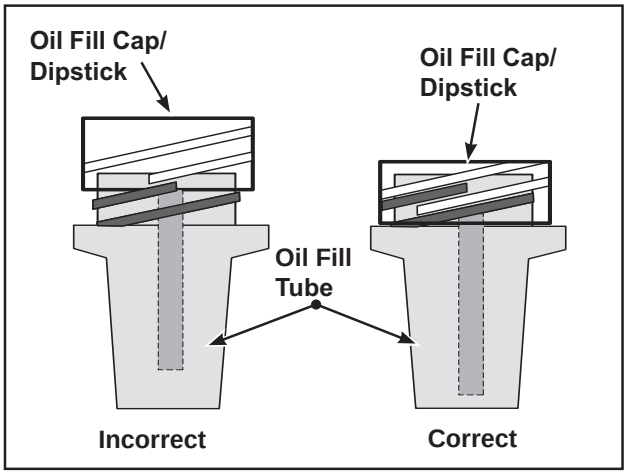


Figure 2. Oil Fill Cap/Dipstick and Oil Fill Tube.

4. Remove the oil fill cap/dipstick and check oil level. The oil level needs to be within the operating range. See Figure 3. If low, add oil of the proper type up to the full mark. If oil is above "F" or FULL mark, drain oil to reach proper level. Reinstall the oil fill cap/dipstick and thread until tight.

NOTE: To prevent extensive engine wear or damage, always maintain the proper oil level in the crankcase. Never operate the engine with the oil level above the "F" or FULL mark, or below the "L" or LOW mark on the dipstick.

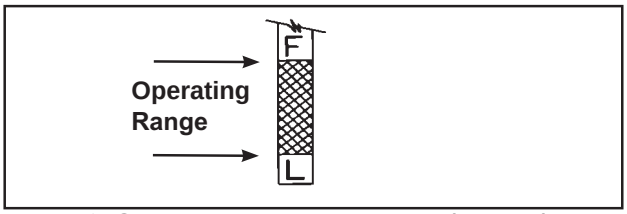


Figure 3. Oil Level Marks on Dipstick (Typical).

Routing	Service Manager	Sales Manager	Parts Manager	Chief Mechanic	Mechanic No. 1	Mechanic No. 2	Mechanic No. 3	Mechanic No. 4	Return This To
Initial Here									

LITHO IN U.S.A. ENGINE DIVISION, KOHLER CO., KOHLER, WISCONSIN 53044

KOHLER ENGINES

Service Bulletin

NO.	288
MODEL	CH/CV940-980
DATE ISSUED 12/07	DATE REVISED

Flywheel and Mounting Stud Replacement

According to field reports, grass screens may loosen on some early CH/CV940-980 engines during use. A revised flywheel has been developed to eliminate the potential of this happening. Follow these directions for proper installation.

WARNING: Accidental Starts!

Disabling engine. Accidental starting can cause severe injury or death. Before working on the engine or equipment, disable the engine as follows: 1) Disconnect the spark plug lead(s). 2) Disconnect negative (-) battery cable from battery.

Disassembly Procedures

1. Disconnect the leads from the spark plugs. See Figure 1.

   NOTE: Pull on boot only, to prevent damage to spark plug lead.

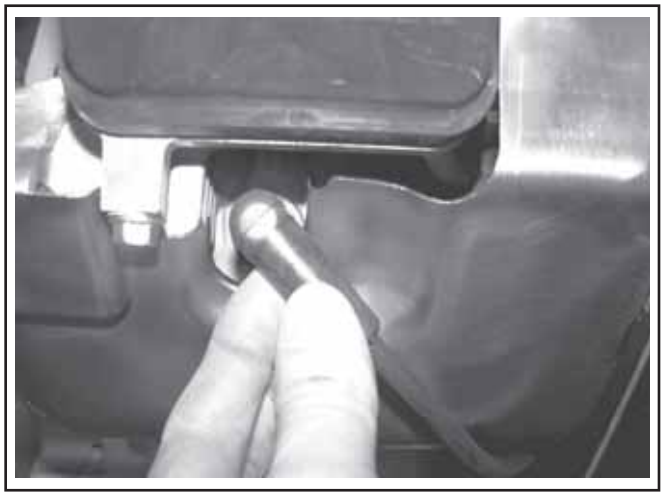


Figure 1. Disconnect Both Spark Plug Leads.

2. Remove the top mounting screw and loosen the two shoulder screws on each side. Lift off the two cylinder shrouds. See Figure 17.

3. Remove the four mounting screws and separate the blower housing from the mounting plate. See Figure 2.

Figure 2. Removing Blower Housing.

4. Rotate the flywheel so the magnet is away from the modules.

5. Remove the mounting screws and disconnect the kill lead from the ignition modules. Note the orientation of the ignition modules. See Figure 3.

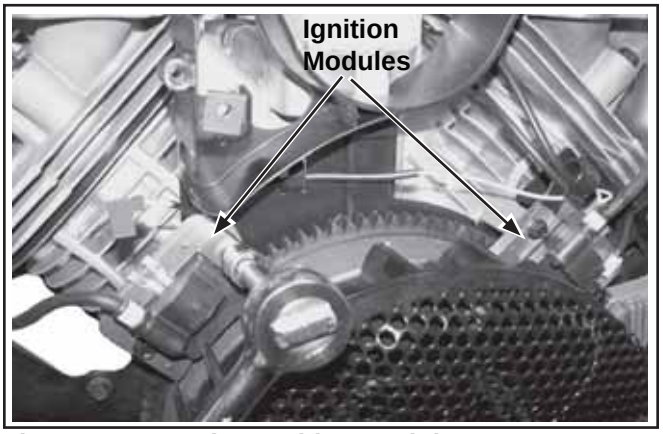


Figure 3. Removing Ignition Modules.

6. Remove the screws, reinforcing washers, grass screen, and stiffener. See Figure 4.

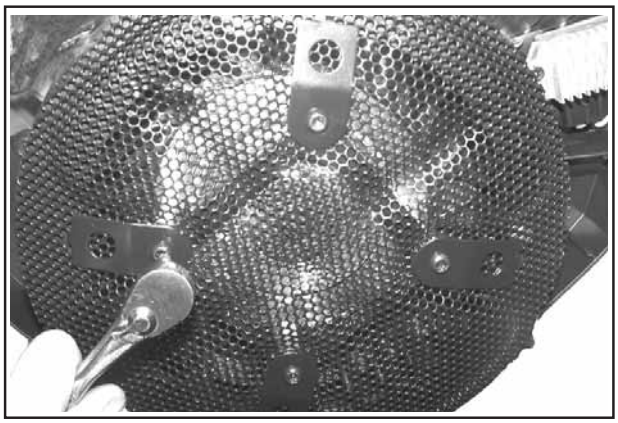


Figure 4. Removing Grass Screen Fasteners.

7. Remove and destroy the mounting studs. See Figure 15.

8. Remove and retain the mounting screws and fan. See Figure 5.

Figure 5. Removing Fan.

9. Use a flywheel strap wrench or holding tool to hold the flywheel and loosen the hex flange screw securing the flywheel to the crankshaft. See Figure 6.

NOTE: Always use a flywheel strap wrench or holding tool to hold the flywheel when loosening or tightening the flywheel screw. **Do not** use any type of bar or wedge to hold the flywheel. Use of such tools could cause the flywheel to become cracked or damaged.

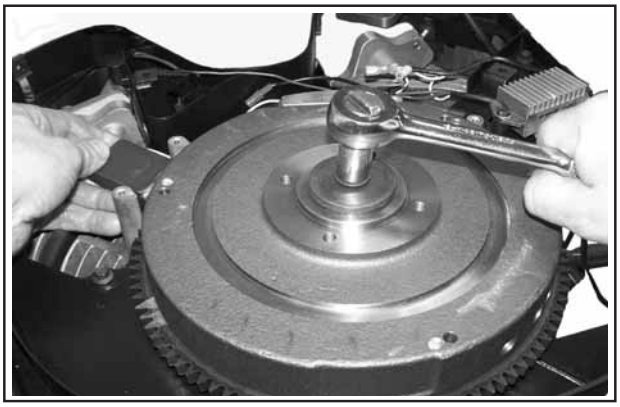


Figure 6. Removing Flywheel Fastener With Holding Tool.

10. Remove the hex flange screw and washer.

11. Use a puller to remove the flywheel from the crankshaft. See Figure 7. Remove and destroy the old flywheel.

NOTE: Always use a flywheel puller to remove the flywheel from the crankshaft. **Do not** strike the crankshaft or flywheel, as these parts could become cracked or damaged.

Figure 7. Removing Flywheel With Puller.

Installation of New Flywheel and New Mounting Studs

WARNING: Damaging Crankshaft and Flywheel Can Cause Personal Injury!

Using improper procedures to install the flywheel can crack or damage the crankshaft and/or flywheel. This not only causes extensive engine damage, but can also cause personal injury, since broken fragments could be thrown from the engine. Always observe and use the following precautions and procedures when installing the flywheel.

NOTE: Before installing the flywheel make sure the crankshaft taper and the flywheel hub are clean, dry, and completely free of any lubricants. The presence of lubricants can cause the flywheel to be over stressed and become damaged when the hex flange screw is torqued to specifications. See Figures 8 and 9.

1. Clean and dry new flywheel hub and crankshaft taper. See Figures 8 and 9.

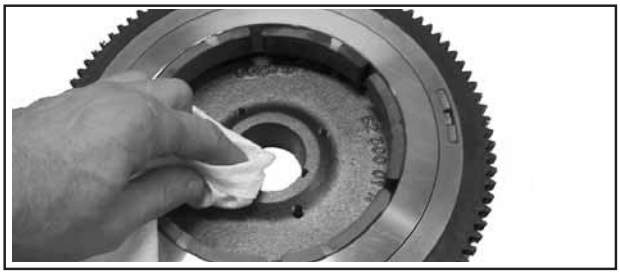


Figure 8. Clean and Dry Flywheel Hub.

Figure 9. Clean and Dry Crankshaft Taper.

2. Install the flywheel onto the crankshaft, being careful not to shift the woodruff key.

3. Install the hex flange screw and washer.

4. Use a flywheel strap wrench or holding tool to hold the flywheel. Torque the hex flange screw to **67.8 N·m (50 ft. lb.)**. See Figure 10.

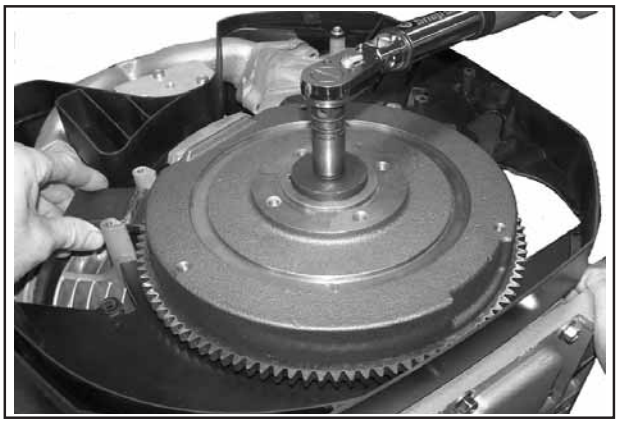


Figure 10. Installing and Torquing Flywheel.

5. Rotate the flywheel to position the magnet away from the ignition module bosses.

6. Connect the ground lead to the single kill tab and install the modules onto the crankcase bosses so the tab is away from you (in). The spark plug lead should be toward you (out). Mount the wiring harness clamp with the loop **up**, on the starter (No. 1) side inner module screw and route the harness through it. Attach the rectifier-regulator ground lead to the outer screw. See Figure 11.

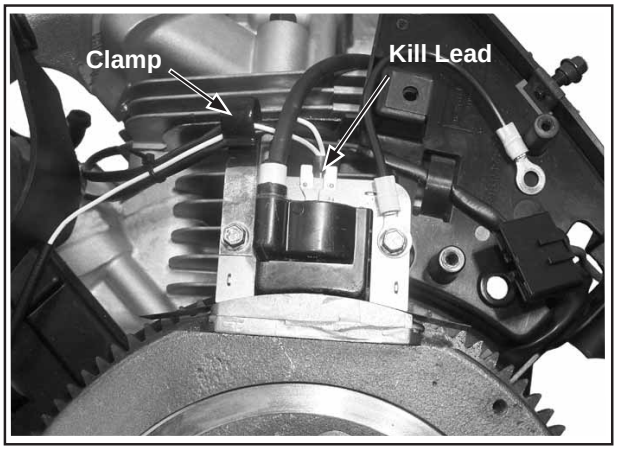


Figure 11. Ignition Module Mounting Details.

7. Slide the modules up as far away from the flywheel as possible and tighten the screws to hold them in that position.

8. Rotate the flywheel to position the magnet directly under one ignition module.

9. Insert a **0.30 mm (0.012 in.)** flat feeler gauge between the magnet and the ignition module. See Figure 12. Loosen the screws enough to allow the magnet to pull the module down against the feeler gauge.

10. Torque the screws to **4.0 N·m (35 in. lb.)**.

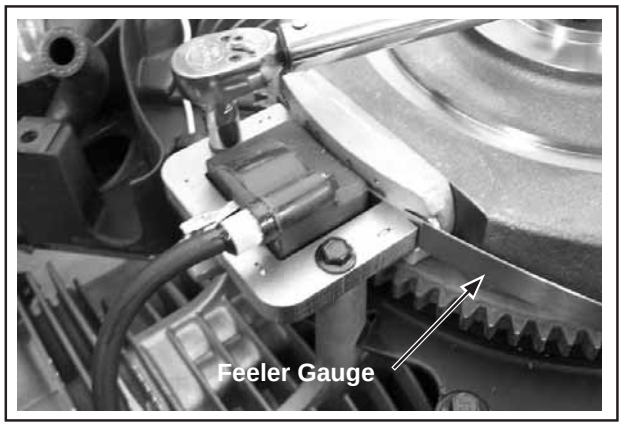


Figure 12. Setting Ignition Model Air Gap.

11. Repeat steps 8 through 10 for the other ignition module.

12. Rotate the flywheel back and forth, checking for clearance between the magnet and ignition modules. Make sure the magnet does not strike the modules. Check the gap with a feeler gauge and readjust if necessary. Final Air Gap: **0.280/0.330 mm (0.011/0.013 in.)**.

13. Place the leads under the molded clip on the starter side. See Figure 13.

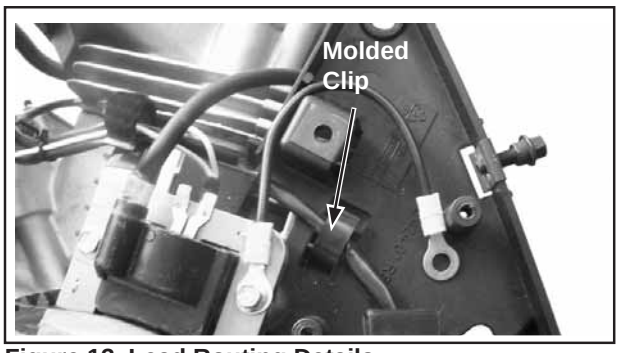


Figure 13. Lead Routing Details.

14. Position the cooling fan onto the flywheel, aligning the mounting locations. Apply a small amount of Loctite® No. 243 to the threads and install the three long mounting screws. Torque the screws to **9.9 N·m (88 in. lb.)**. See Figure 14.

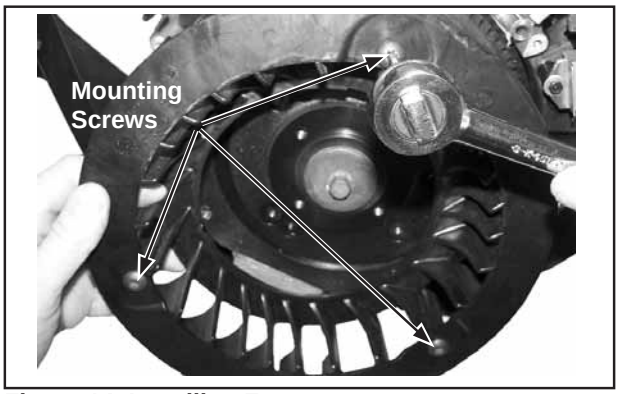


Figure 14. Installing Fan.

CAUTION: Grass Screen Can Cause Personal Injury

Failure to utilize or reassemble the grass screen as designed could result in grass screen failure and serious personal injury.

15. Thread the four grass screen mounting studs into the mounting holes in the flywheel. Torque each stud to **9.9 N·m (88 in. lb.)**. See Figure 15.

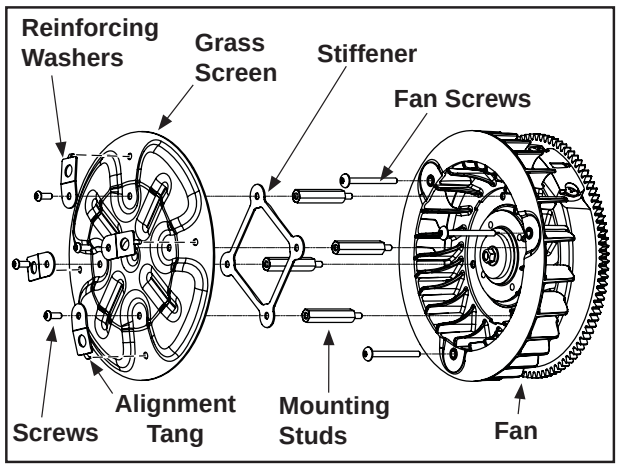


Figure 15. Fan and Grass Screen Installation Details.

16. Install the stiffener followed by the metal grass screen onto the four hex studs. Position the reinforcing washers so the mounting holes are aligned with the stud holes, the extended tab is toward the outer edge of the grass screen, and the alignment tang is inserted into one of the grass screen holes. Secure with the mounting screws using Loctite® No. 243 on the threads. Torque the screws to **9.9 N·m (88 in. lb.)**. See Figure 15.

17. Align and install the blower housing. See Figure 16.

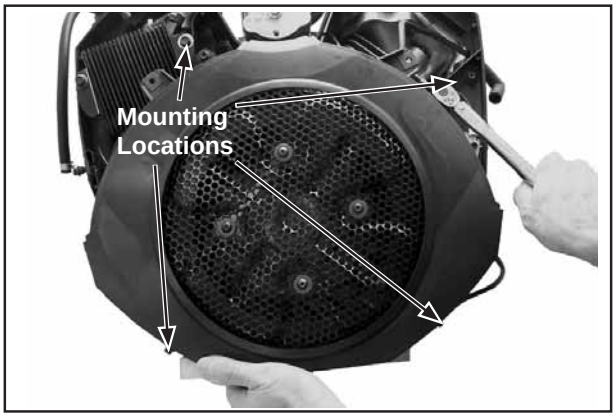


Figure 16. Installing Blower Housing.

18. Secure the blower housing with the four shoulder screws. Torque the screws to **2.0 N·m (17.7 in. lb.)**.

19. Install the two cylinder shrouds and secure with the shoulder screws. Torque the screws to **2.0 N·m (17.7 in. lb.)**. See Figure 17.

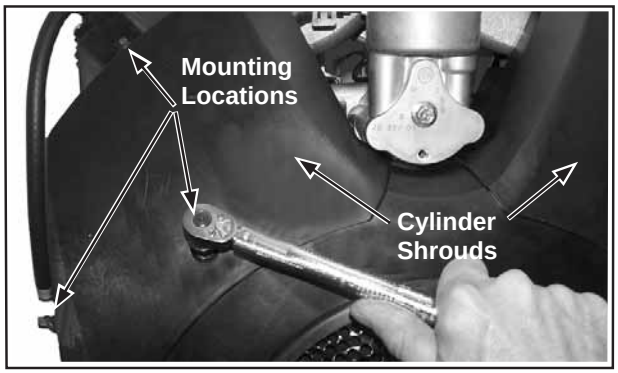


Figure 17. Installing Cylinder Shrouds.

20. Reconnect the spark plug leads, negative (-) battery cable and test run the engine.

Please Note: File a warranty claim for the repair. Write the number **ME-4125-M** in the "Authorized By" space in box 17 of the warranty claim form.

KOHLER ENGINES

Service Bulletin

NO.	289
MODEL	CH/CV730
DATE ISSUED	1/08
DATE REVISED	4/08

Flywheel Timing Change

CH/CV730 engines originally had 22° BTDC ignition timing. With that timing, reports of some head gasket failures were received after the engines got into the field, so the timing was then retarded to 16° BTDC. An offset flywheel key (Part No. 24 340 02-S) has now been created, so engines with 22° timing can be easily converted to the preferred 16° timing. If you are replacing a head gasket on a CH/CV730 engine, check which flywheel it has. If a 22° flywheel is in use, replacement of the straight key with an offset key is recommended.

WARNING: Accidental Starts!

Disabling engine. Accidental starting can cause severe injury or death. Before working on the engine or equipment, disable the engine as follows: 1) Disconnect the spark plug lead(s). 2) Disconnect negative (-) battery cable from battery.

Flywheel Identification

1. Determine the flywheel in use by comparing it to Figures 1 and 2.

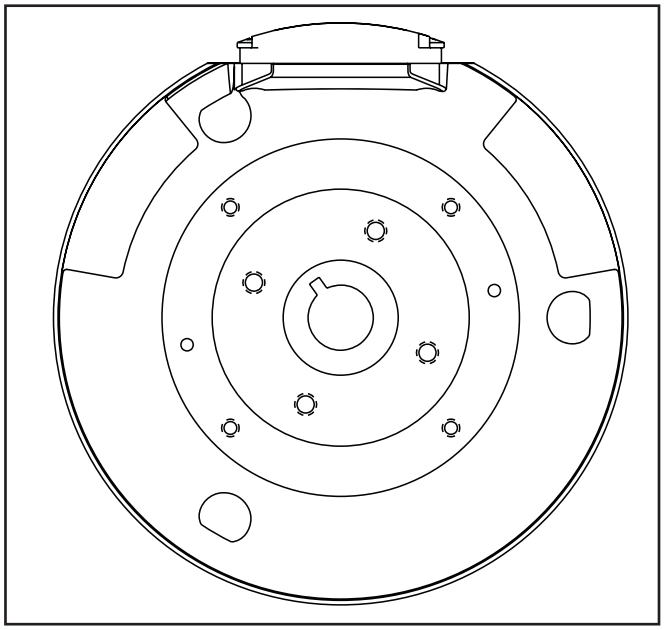


Figure 1. 22° Flywheel (no Identification Mark).

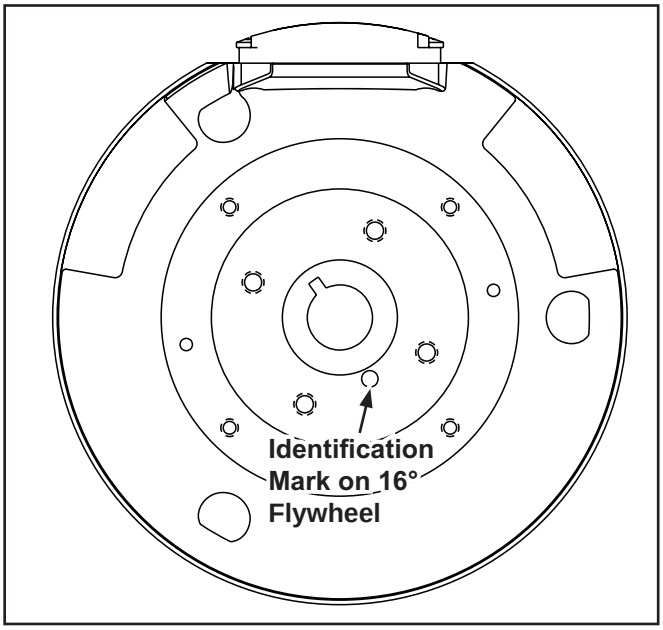


Figure 2. 16° Flywheel (with Identification Mark).

Installation of 6° Offset Key

The offset woodruff key (Part No. 24 340 02-S) is used to change the orientation of the original 22° flywheel to 16° timing.

NOTE: These instructions cover only an outline of what is involved. Refer to the applicable service manual for complete disassembly and reassembly procedures.

1. Remove the straight woodruff key and discard it. See Figure 3.

2. Install the 6° offset key. See Figure 4. Correct orientation of the key is necessary for proper ignition timing. The identification mark must face out, when viewing the flywheel as it is mounted. See Figures 5 and 6.

NOTE: Improper installation of the offset key can cause improper ignition timing and damage to the engine.

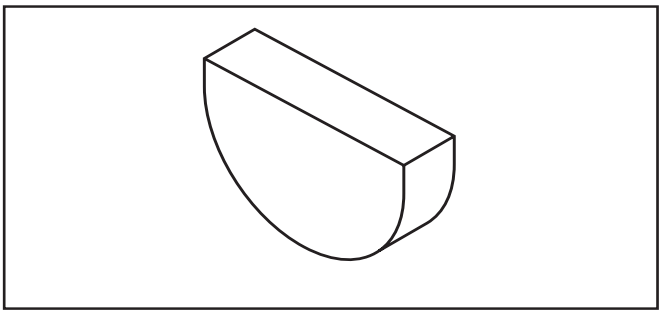


Figure 3. Straight Woodruff Key.

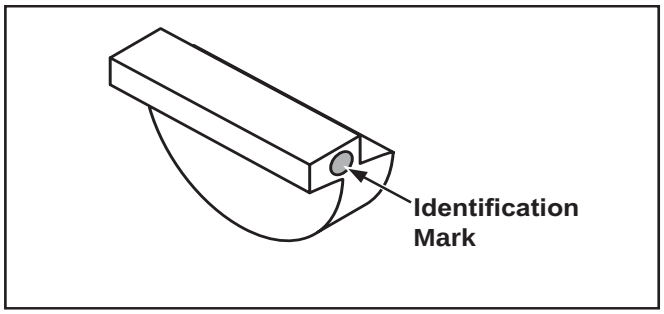


Figure 4. Offset Key.

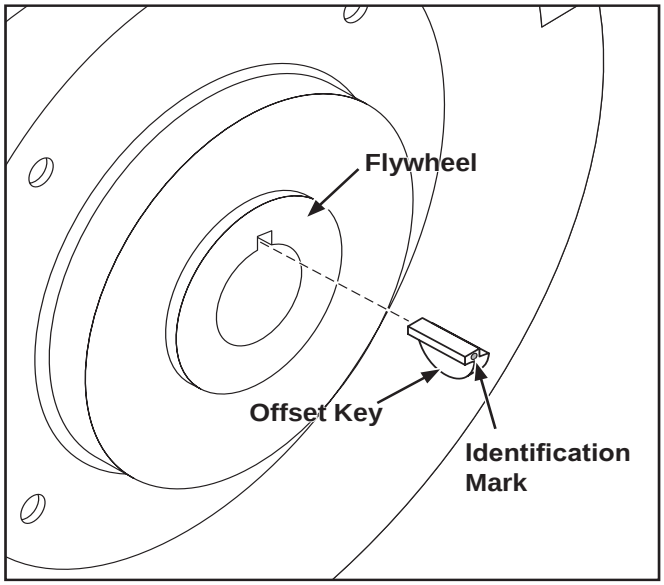


Figure 5. Correct Offset Key Installation.

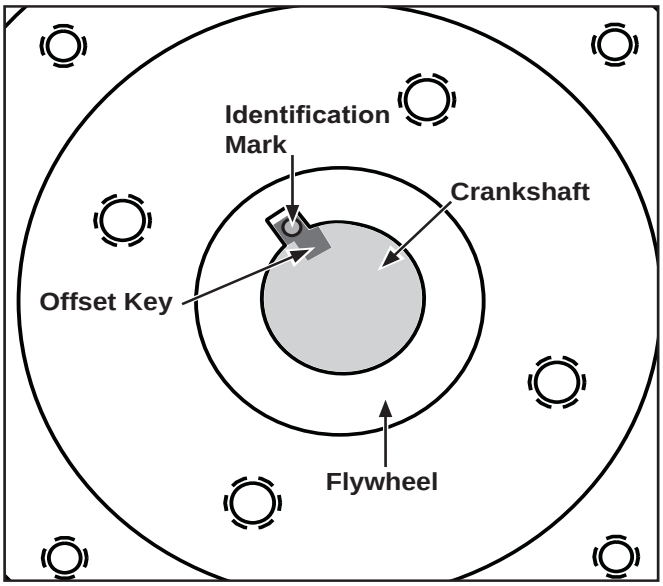


Figure 6. Correct Offset Key Orientation.

NOTE: If a 22° flywheel is being replaced on a CH/CV730 engine, it is recommended that a 16° flywheel and straight woodruff key be used.

KOHLER ENGINES

Service Bulletin

NO.	290
MODEL	Various
DATE ISSUED	5/08
DATE REVISED	

Oil Pressure Switch 25 099 27-S

Isolated field reports indicate that some vendor supplied oil pressure switches give a false low pressure signal. The suspect MVD parts include date codes of 10-07 and 11-07.

There are no reported problems with the FAS part. The FAS parts are easily identified when compared to the MVD parts.

If a low oil pressure condition is suspected, replace a faulty oil pressure switch with a known good one before continuing with other service procedures.

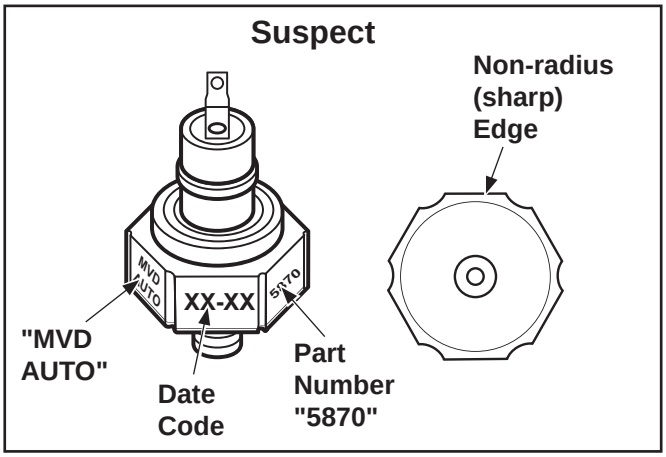


Figure 1. MVD Oil Pressure Switch.

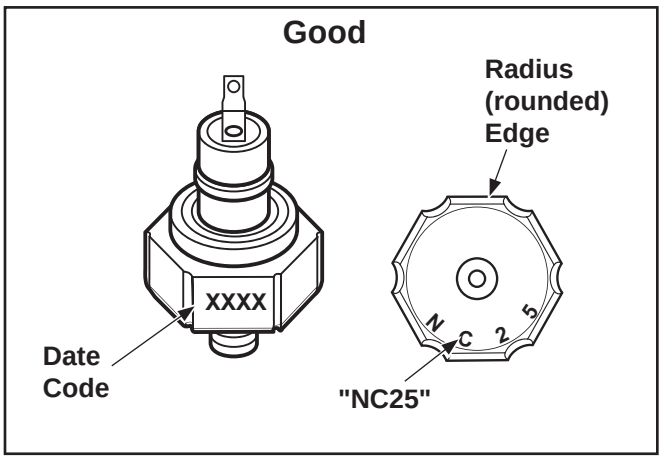


Figure 2. FAS Oil Pressure Switch.

Please Note: File a warranty claim for the repair. Write the number **ME-4292-N** in the "Authorized By" space in box 17 of the warranty claim form.

KOHLER ENGINES

Service Bulletin

NO.	291
MODEL	CH740 and CV740

DATE ISSUED	DATE REVISED
9/08	10/08

DSAI Interface Wire Harnesses with Diodes

Isolated field reports indicate that in some applications DSAI modules require diode protection. To eliminate the potential for future failure, Kohler requests that all engines with the following spec numbers and serial number range be updated with a DSAI interface wire harness.

Spec Numbers: CH740-3114
CV740-0006
CV740-0021
CV740-0035
CV740-0040
CV740-3110
CV740-3111
CV740-3112
CV740-3118

Engines with DSAI ignition systems that have **Serial Number 3823303501 and below**.

A number of engines have been reworked with the new wire harnesses at the factory. The reworked engines have been marked with a green dot near the dipstick on the oil pan/ closure plate.

Verify the connector style for the power and kill connections. The two replacement harnesses with diode protection are as follows:
Harness Kit **24 176 153-S** has "spade" connectors.
Harness Kit **24 176 154-S** has "bullet" connectors.

Please Note: File a warranty claim for the repair.
When filing an electronic warranty claim, type the number **ME4410N** in the "Work Unit" box at the top section of the form.
When filing a paper form, write the number **ME4410N** in the “Authorized By” space in box 17 of the warranty claim form.

KOHLER ENGINES

Technical Flash

HTC-102007

Ground Relocation on Dixon ZTR Mowers

Subject: Electrical Grounding on Kodiak 908 and RAM 50 Series Mowers with Kohler CV20 Engines

The following wiring changes may ensure a more positive ground path and guard against a potential engine failure.

1. Disconnect the spark plug leads and negative (-) battery cable from battery.

2. Remove the negative battery cable, the two white ground lead terminals (double wire leads on RAM 50 units) and the star washer from the RH forward engine mounting bolt. Reinstall the lock nut and torque the nut and bolt to **28.3 N·m (250 in. lb.)**. See Figure 1.

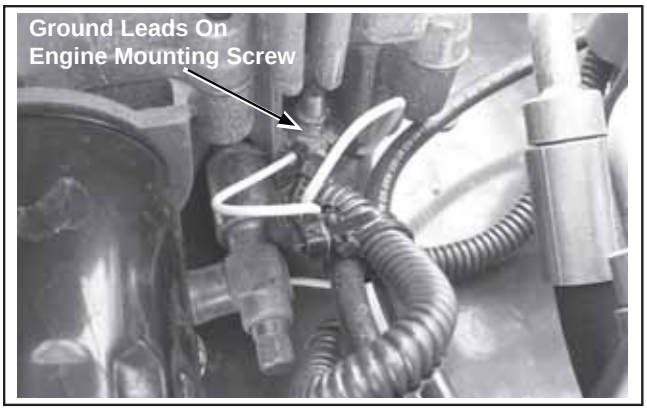


Figure 1. Original Layout (Kodiak 908 Shown).

3. Remove the silver-plated closure plate screw (Kohler Part No. 24 086 17-S) from the RH corner (No. 4) location. Determine if the negative (-) battery cable is long enough to connect to one of the starter mounting screw locations (preferred location). Attach the two white ground leads, the negative ground lead (if unable to reach starter mounting screw), followed by the star washer removed in step 2, then reinstall the screw. Torque the screw to **24.4 N·m (216 in. lb.)**. See Figures 2 and 3.

Figure 2. Relocated RH Ground Layout (Kodiak 908).

Figure 3. Relocated RH Ground Layout (RAM 50).

4. Remove the LH front engine mounting nut, all attached ground leads, and the star washer in this location. Some models will only have the chassis ground cable. Reinstall the nut and torque to **28.3 N·m (250 in. lb.)**. See Figure 4.

Figure 4. Original LH Ground Layout (Kodiak 908 Shown).

Litho In U.S.A. 10/07

ENGINE DIVISION, KOHLER CO., KOHLER, WISCONSIN 53044

KOHLER ENGINES

Technical Flash

HOP-122007

Engines Stalling With Fuel in Tank

According to field reports, some Courage single-cylinder engines may stall and/or stop running with as much as 1/2 of a tank of gasoline remaining while operating on rough and uneven terrain, or extensively hilly landscape. If normal troubleshooting procedures reveal no cause, it may be due to gum or varnish deposits in the carburetor. A thorough cleaning of the carburetor is recommended, especially the inlet needle and seat and the high-speed jet pressed into the bottom of the tower. Test run the unit to determine if the reported problem is resolved. If stalling or stopping continues, replace the carburetor and file warranty.

Warranty claims for carburetor cleaning and/or replacement should be submitted through an authorized Kohler service outlet. Carburetor cleaning (including R&R) takes approximately 1 hour. Carburetor replacement takes approximately 0.5 hours. **Please Note**: Write the number **ME-4105-M** in the "Authorized By" space in Box 17 of the warranty claim form.

If carburetor replacement does not resolve the problem, order and install Electric Fuel Pump Kit Part No. 506 20 69-01, available from an authorized Husqvarna distributor at no cost. Installation takes approximately 40 minutes. Claims for fuel pump kit installation will be reimbursed by Husqvarna at the hourly labor rate presently applicable in your country.

Litho In U.S.A. 12/07 ENGINE DIVISION, KOHLER CO., KOHLER, WISCONSIN 53044

KOHLER ENGINES

Technical Flash

KEK-032008

XT-7 Fuel Tank Outlet Flash Removal

Some early production XT-7 Engines that lack power, skip, or misfire may have a partially restricted fuel tank outlet. Below are instructions to remove flash from the fuel tank outlet.

WARNING: Accidental Starts!

Disabling engine. Accidental starting can cause severe injury or death. Before working on the engine or equipment, disable the engine as follows: 1) Disconnect the spark plug lead(s). 2) Disconnect negative (-) battery cable from battery.

WARNING: Explosive Fuel!

Gasoline is extremely flammable and its vapors can explode if ignited. Store gasoline only in approved containers, in well ventilated, unoccupied buildings, away from sparks or flames. Do not fill the fuel tank while the engine is hot or running, since spilled fuel could ignite if it comes in contact with hot parts or sparks from ignition. Do not start the engine near spilled fuel. Never use gasoline as a cleaning agent.

Fuel Tank Outlet Flash Removal

1. **Disable engine by disconnecting spark plug lead.**
2. Ensure gas tank is completely empty of fuel. Do not reuse fuel; dispose of according to local regulations.
3. Using pliers, pinch open fuel tank hose clamp and slide clamp up hose. See Figure 1.
4. Disconnect fuel hose from fuel tank by carefully sliding fuel line straight off nipple.

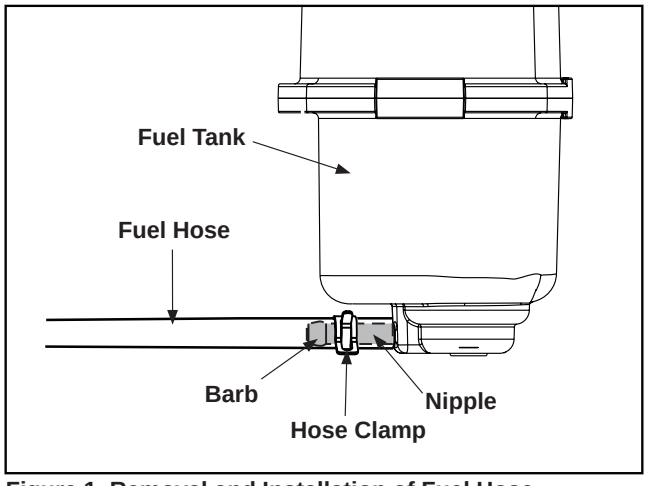


Figure 1. Removal and Installation of Fuel Hose.

5. Insert a 2.2 mm (.078 in.) stiff wire into fuel tank nipple. Remove any flashing or debris from inside nipple. See Figure 2.
6. Verify outlet obstruction has been removed by inserting wire 50.8 mm (2.0 in.) into nipple .

NOTE: To ease fuel hose installation, WD-40® may be used. Do not use water-based lubricants.

7. Slide fuel hose over barb until seated against tank. See Figure 1.
8. Using pliers, pinch open hose clamp and slide over barb.
9. Reconnect spark plug lead.

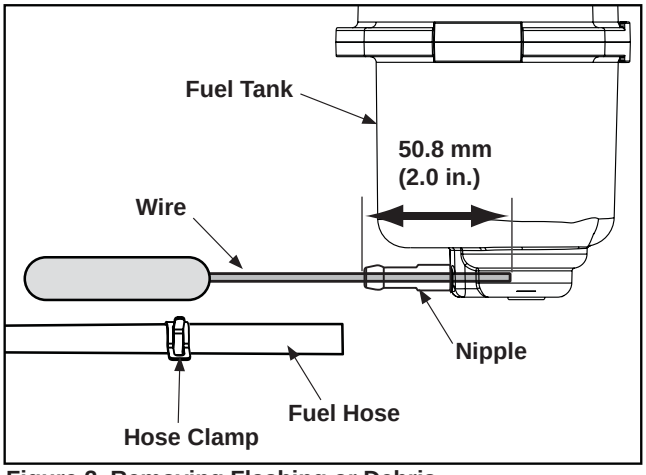


Figure 2. Removing Flashing or Debris.

Litho In U.S.A. 03/08

ENGINE DIVISION, KOHLER CO., KOHLER, WISCONSIN 53044

KOHLER ENGINES

Technical Flash

ARIENS-052008

Courage XT-7 Flywheel Brake Ignition Grounding Issue

On some Courage XT-7 engines it is possible that the ignition grounding system on the flywheel brake may remain "open," even though the brake bail has been released. In the event that an engine is not grounding or shutting down, use the following steps to diagnose and correct the problem.

WARNING: Accidental Starts!

Disabling engine. Accidental starting can cause severe injury or death. Before working on the engine or equipment, disable the engine as follows: Disconnect the spark plug lead.

1. Ensure oil and gas are filled to the correct operational levels.
2. Start lawn mower and release brake bail to verify if the ignition grounds and the engine stops.
3. If the ignition fails to ground out, use a flat blade screwdriver and short the ground tab and the brake lever by contacting both. See Figure 1.

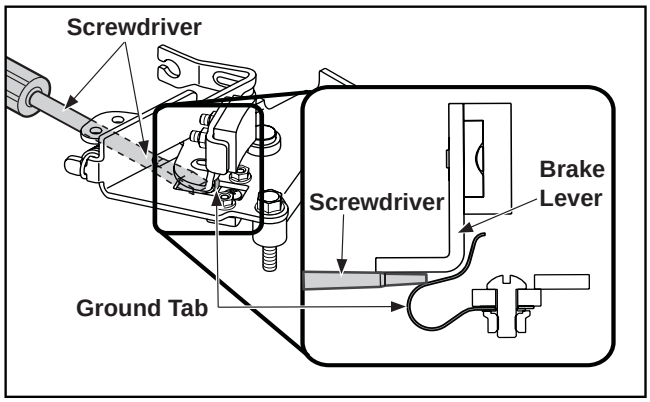


Figure 1. Screwdriver and Ground Tab Contact.

4. Remove four Torx screws securing engine cover insert and remove insert.
5. Remove three hex flange nuts and two hex flange screws securing engine cover, and remove cover.
6. Visually inspect the position of the brake lever in relation to the brake ground tab, with the bail released. See Figure 2.
7. If the two surfaces do not come into contact with each other, adjust the curved ground tab by bending it towards the brake pad. See Figure 2.

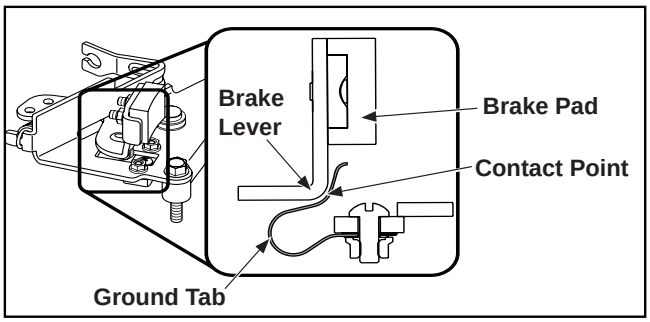


Figure 2. Brake Lever and Ground Tab Contact Point.

8. Engage the brake bail until the brake lever rotates with approximately 1/16-1/8" travel at the location of the contacting surface. The adjustment will be correct when the ground tab remains in contact through initial range of motion and no longer remains in contact with further bail travel. See Figure 3.

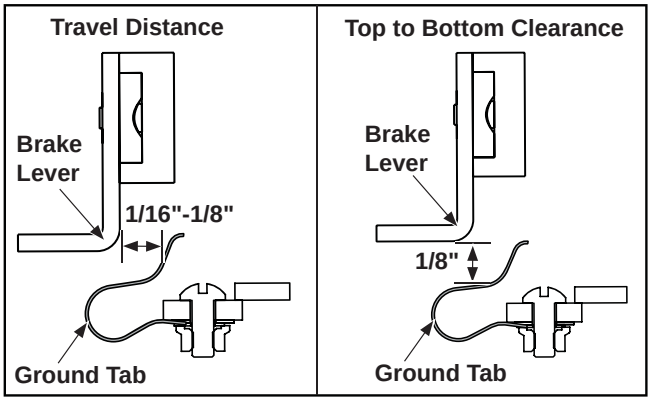


Figure 3. Brake Lever and Ground Tab Adjustment.

9. After adjustment, verify that the top surface of the ground tab does not contact the bottom surface of the brake lever. The adjustment will be correct with no less than 1/8" clearance. See Figure 3.
10. Reinstall engine cover and insert. Torque hardware as specified in service manual.

Litho In U.S.A. 05/08 ENGINE DIVISION, KOHLER CO., KOHLER, WISCONSIN 53044

KOHLER ENGINES

TechTip
2008-02

Electronic Governor
Overview, Diagnosing, and Troubleshooting
(Units with Governor Control Unit 24 584 59-S)

There have been some reports regarding the function, adjustment, and troubleshooting of the electronic governor system. Field reports indicate that a substantial number of field diagnoses are being done incorrectly. This document has been made to explain the system, aid in diagnosing and troubleshooting the system and its components.

Document Table Contents
General Description .....page 1
Component Description .....page 1
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Harness/GCU
Troubleshooting Procedures .....pages 3-4
Blink Code Test .....pages 4-5
Troubleshooting
Flow Chart .....pages 6-7
Electrical Diagram .....page 8

General Description
The electronic governor regulates the engine speed at varying loads. It consists of linkage, a digital linear actuator (DLA), and a governor control unit (GCU). See Figures 1-3.

Component Description
The **Linkage** consists of a spring and other linkage pieces which connect the DLA to the throttle.

The **Governor Control Unit (GCU)** regulates the engine speed by a variable input voltage from the application (potentiometer or a single pole, single throw (SPST) switch). GCU safety features include an engine overspeed condition, the GCU will shut down the engine by grounding the ignition modules. Also, if power is lost to the GCU, the engine will shut down the engine by grounding the ignition.

The **Digital Linear Actuator (DLA)** converts electrical signals into precise stepped rotational movement through a stator-rotor combination. **Note: The DLA is not a solenoid. It is a delicate precision motor. Do not put force on the center shaft.** The DLA actuates the throttle linkage. When power is removed, the actuator shaft remains in position. Two DLA and linkage styles have been used to date. The new DLA and linkage style is backwards compatible. See Figure 2.

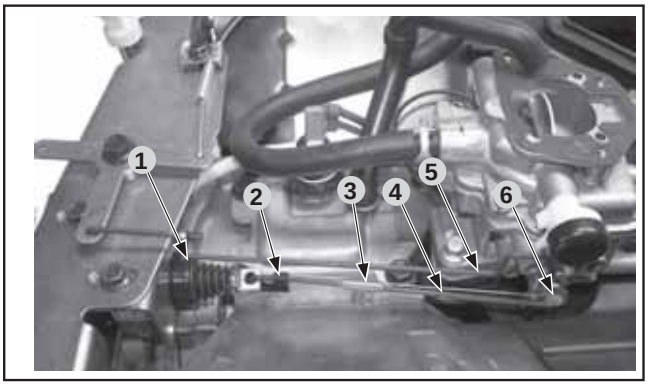


Figure 1. Governor Assembly Components.

1. Digital Linear Actuator
2. Linkage Retaining Clip - plastic
3. Linkage Spring
4. Throttle Linkage
5. Choke Linkage
6. Throttle Lever Adapter

Note: This is not a solenoid!
Do not exert force to the center shaft.

Figure 2. Digital Linear Actuator (New and Old Styles).

Litho In U.S.A. 9/08
ENGINE DIVISION, KOHLER CO., KOHLER, WISCONSIN 53044

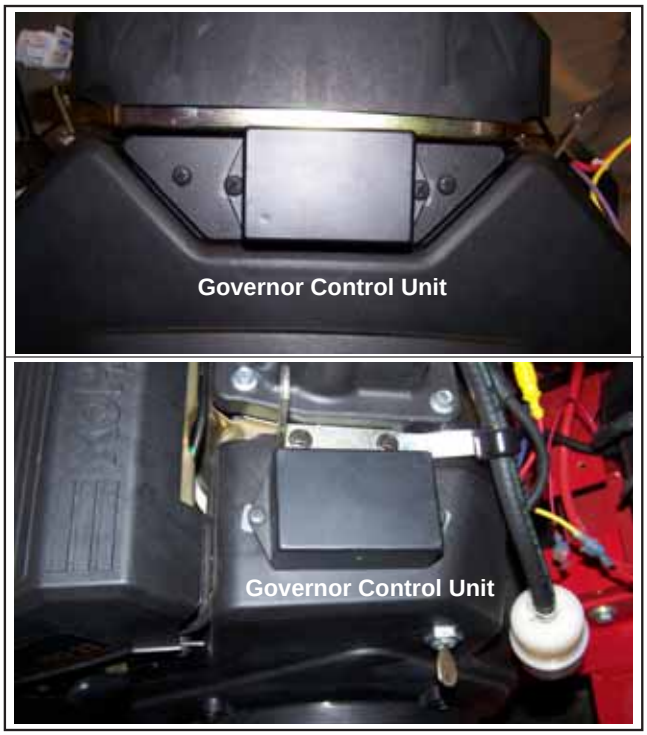


Figure 3. Governor Control Unit Locations.

Mechanical Checks

The DLA must be in the fully retracted position during assembly. The full range of throttle plate movement will not be achieved if the DLA is partially extended when assembled. Loosen the two DLA mounting plate screws located on the top of the actuator plate. With the throttle linkage centered in the U-Clip or secured with a retaining clip at the end of the DLA shaft, slide the DLA bracket assembly back until the throttle plate is fully open. Torque the mounting plate screws to **2.5 N·m (22 in. lb.)**.

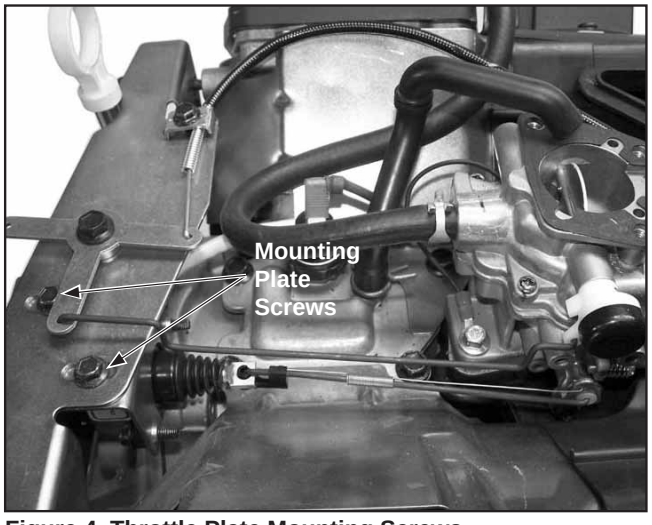


Figure 4. Throttle Plate Mounting Screws.

If the clevis shaft becomes overextended or disconnected from the actuator reinstall as follows:

1. Disconnect linkage and remove the Digital Linear Actuator (DLA) from the control assembly. See Figure 1.
2. Remove clevis shaft completely out of DLA. See Figure 5.
3. Reinstall the rubber boot onto the DLA if required.
4. Place the clevis shaft into the actuator. Rotate the clevis shaft clockwise 3 full turns, applying slight pressure, until you feel the clevis shaft keyway make contact with the key in the actuator. When the clevis shaft is installed properly the flat of the clevis will be aligned with the two mounting holes.

NOTE: Continuing to rotate the clevis shaft after it has made contact with the keyway will damage the keyway or the actuator.

5. Confirm that the key and keyway are in alignment, by hand, press the clevis shaft into the actuator. It will take a reasonable amount of pressure to do this. If the shaft will not move inward, do not force it. Remove the clevis shaft repeat the previous step.
6. Install DLA into the control assembly and connect linkage. See Figure 1.

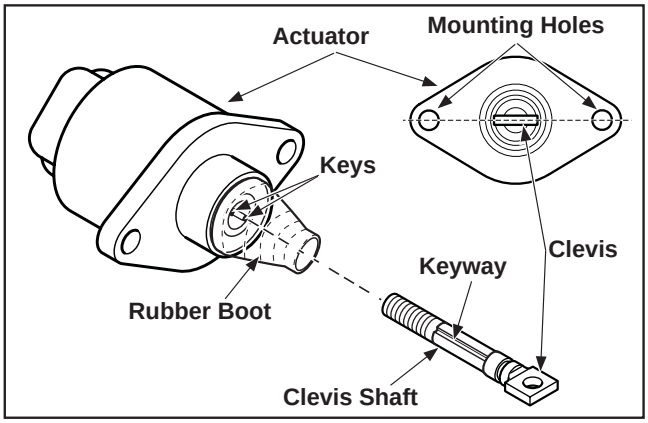


Figure 5. Exploded View of Clevis Shaft.

Harness/GCU Trouble Shooting and Diagnostic Procedures

1. Switch the key to the off position.

2. Remove the GCU and unplug the wiring harness. See Figures 6 and 7.

Figure 6. GCU Location Removal and Installation.

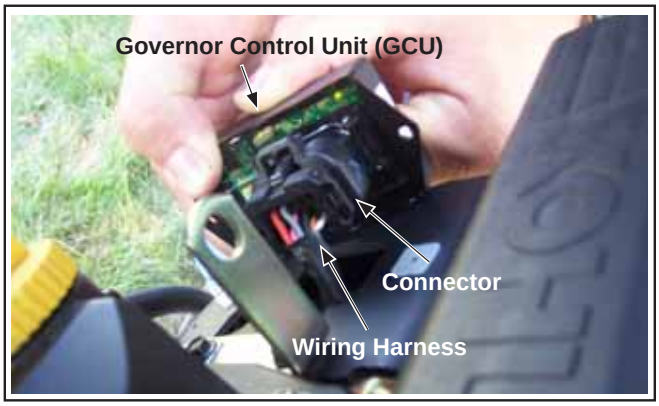


Figure 7. GCU, Wiring Harness, and Connector.

Ground and Power Tests

The following two tests check for power and ground supply to the GCU. If either test fails the harness, electrical connections, or electrical system needs repair.

NOTE: It is important to use the proper sized probes to preform the following test. Probes that are the incorrect size can damage the connector or harness plug.

Test 1: Identify the following probe location in the connector. Using a continuity tester, check for a good ground. See Figure 8. If the ground is faulty, inspect the unit ground, battery ground, connectors, and wiring harness. Clean or fix connections or replace any faulty parts.

If test 1 checks ok locate the following wire ends in the plug, and check using test #2.

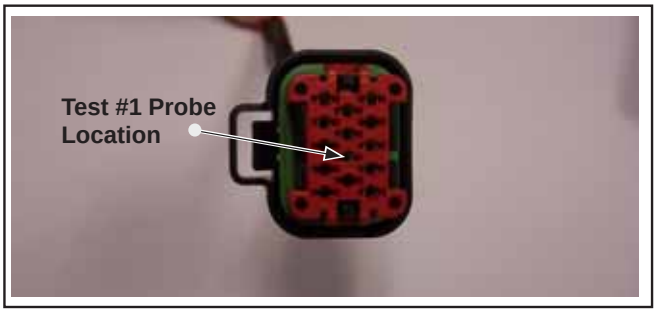


Figure 8. Test #1 Probe Location for Ground Test.

Test 2: Identify the following probe location in the connector. Using a 12 volt meter test for voltage. See Figure 9. Turn the key switch to the "ON" position. The voltage should be within +/- 1 volt of battery voltage. If the voltage is within +/- 1 volt of battery voltage, harness is ok - Replace the GCU. If not within +/- 1 volt of battery voltage - Check connections and replace wiring harness if necessary.

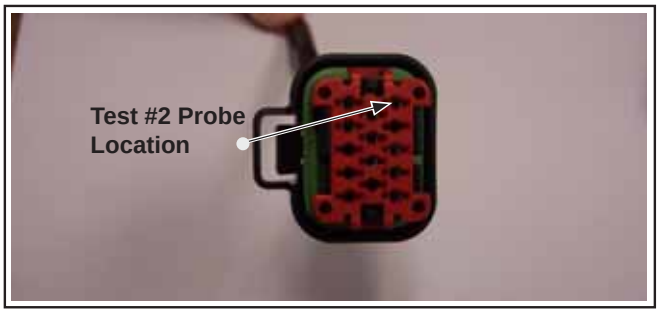


Figure 9. Test #2 Probe Location for Voltage Test.

OHMs Tests

Remove the GCU and unplug the wiring harness. See Figure 6 and 7.

The following two tests are for measuring the resistance of the DLA circuit that send a signal to the GCU. If either test fails the DLA is no good and should be replaced. If both test are good the DLA is neither shorted or open, it is good. An another component, connection or input is most likely at fault.

Test 1: Identify the following wire ends in the plug. Using a digital multi-meter set to the lowest scale (0-200 ohms) place the probes onto the harness making sure of a good connection. Resistance should be between 47.7 and 58.3 ohms. See Figure 10.

If test 1 checks okay locate the following wire ends in the plug, and check using test #2.

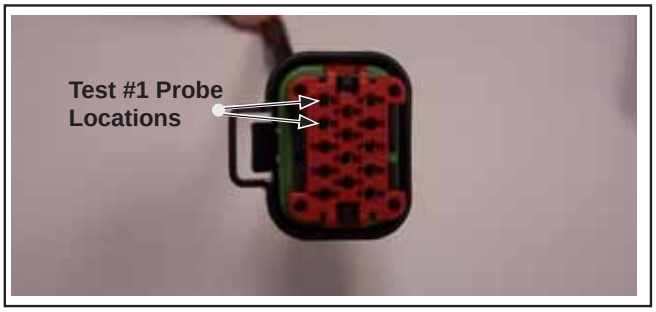


Figure 10. Test #1 Probe Locations for OHMs Test.

Test 2: Identify the following wire ends in the plug. Using a digital multi-meter set to the lowest scale (0-200 ohms) place the probes onto the harness making sure of a good connection. Resistance should be between 47.7 and 58.3 ohms. See Figure 11.

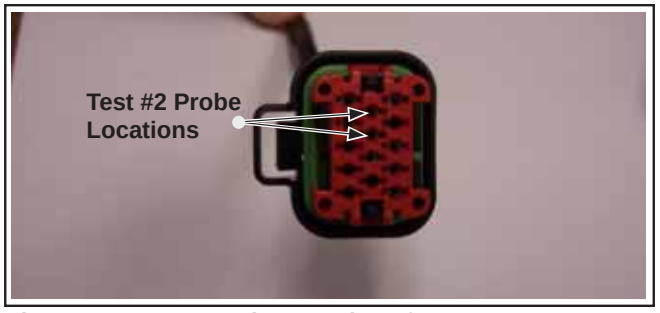


Figure 11. Test #2 Probe Locations for OHMs Test.

If either test 1 or 2 fail the resistance test, the fault could also be caused by a break/cut in the wiring harness. Inspect and test for a potential harness issue prior to replacing the DLA assembly.

Speed Control Input

The connection is either a single wire red w/yellow tracer, or a 6 pin connector body with a red wire w/yellow tracer. See Figures 12 or 13.

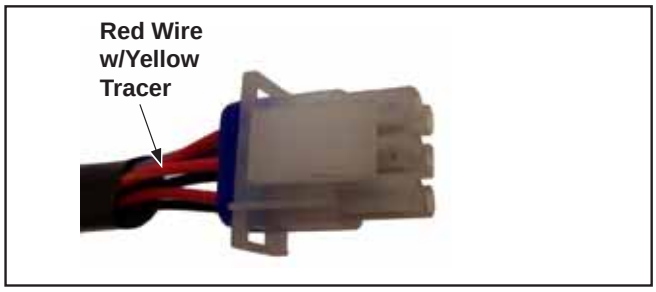


Figure 12. 6 Pin Connector.

Figure 13. Red Wire with Yellow Tracer.

Blink Code Tests for the GCU

Speed control issues can also be diagnosed utilizing the on-board - “Blink Code” diagnostic lights equipped in the GCU. See Figure 14. These GCUs store blink codes/trouble codes, can be quickly diagnosed using the light code charts. See Figures 15 and 16.

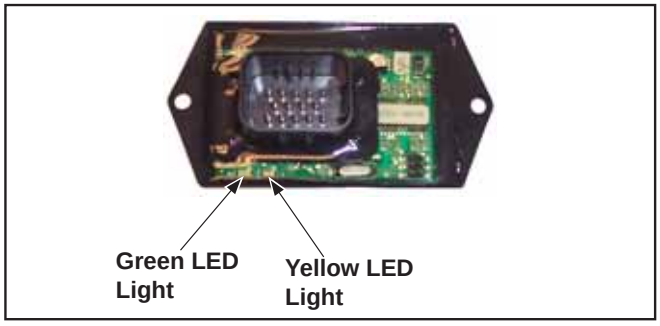


Figure 14. Governor Control Unit.

Governor Control Unit (24 584 59-S) Blink Codes for Software Version: KGETO301 Stored Codes - Activated when the key is turned to the "on" position.					
				LED Diagnostics	
Failure Condition	**Possible Causes**	**Response**	**Response Time**	**Yellow LED**	**Green LED**
Speed Error				BLINKS	ON
Watchdog Interrupt	RFI interference	Ground to kill, close carb throttle plate		BLINKS	BLINKS
	Overtemp				
	Software bug				
	Lightning				
Overspeed (Over 4500 RPM for 0.5 seconds sustained)	External Noise on ignition input	Ground to kill, close carb throttle plate	1 second delay	ON	ON
	Frozen carb throttle plate				
	DLA failure				
	Mechanical bindage				
Excessive Battery Voltage (> 18v for .5 seconds)	Open battery voltage on B+ 24 V battery (Not Compatible with system, 12 V battery only)	Ground to kill, close carb throttle plate	0.5 seconds	OFF	ON

Figure 15. GCU Blink Code Chart with Key in the "on" Position.

Governor Control Unit (24 584 59-S) Blink Codes for Software Version: KGETO301 Running Codes - Activated when the engine is running.					
				LED Diagnostics	
Failure Condition	**Possible Causes**	**Response**	**Response Time**	**Yellow LED**	**Green LED**
Running Normally		None		BLINKS	BLINKS
RPM Too High	Mechanical bindage	None		ON	BLINKS
RPM Too Low	Mechanical bindage	None		ON	BLINKS
Missing Pulse (Normal RPM)	Faulty igniting Faulty ignition wiring			BLINKS	ON
Missing Pulse (RPM Too High)	Faulty igniting Faulty ignition wiring			ON	ON
Missing Pulse (RPM Too Low)	Faulty igniting Faulty ignition wiring			OFF	ON
Sleep Mode	Power at GCU with no ignition pulses (left in run mode)	System Shutdown	30 Minutes	OFF	OFF
Watchdog Interrupt	RFI interference	Ground to kill, close carb throttle plate	N/A	BLINKS	OFF
	Overtemp				
	Software bug				
	Lightning				
Overspeed (Over 4500 RPM for 0.5 seconds sustained)	External Noise on ignition input				
	Frozen carb throttle plate				
	DLA failure				
	Mechanical bindage		1 second delay	ON	OFF
Excessive Battery Voltage (> 18v for .5 seconds)	Open battery voltage on B+ 24 V battery (Not Compatible with system, 12 V battery only)	Ground to kill, close carb throttle plate	0.5 seconds	OFF	OFF

Figure 16. GCU Blink Code Chart with the engine Running.

Kohler Electronic Governor Troubleshooting Chart

Turn off key switch

Do Not Touch the Digital Linear Actuator (DLA)
NOTE: The DLA is not a solenoid. It is a precision electronic motor. Do not exert force to the center clevis shaft!

Visually inspect the DLA and Linkage. Figure 1 or 4

Fail if

Pass if → Confirm the following:
1. Clevis shaft and boot in place
2. Clip attached
3. DLA wire attached

Clevis shaft and boot are out of the DLA

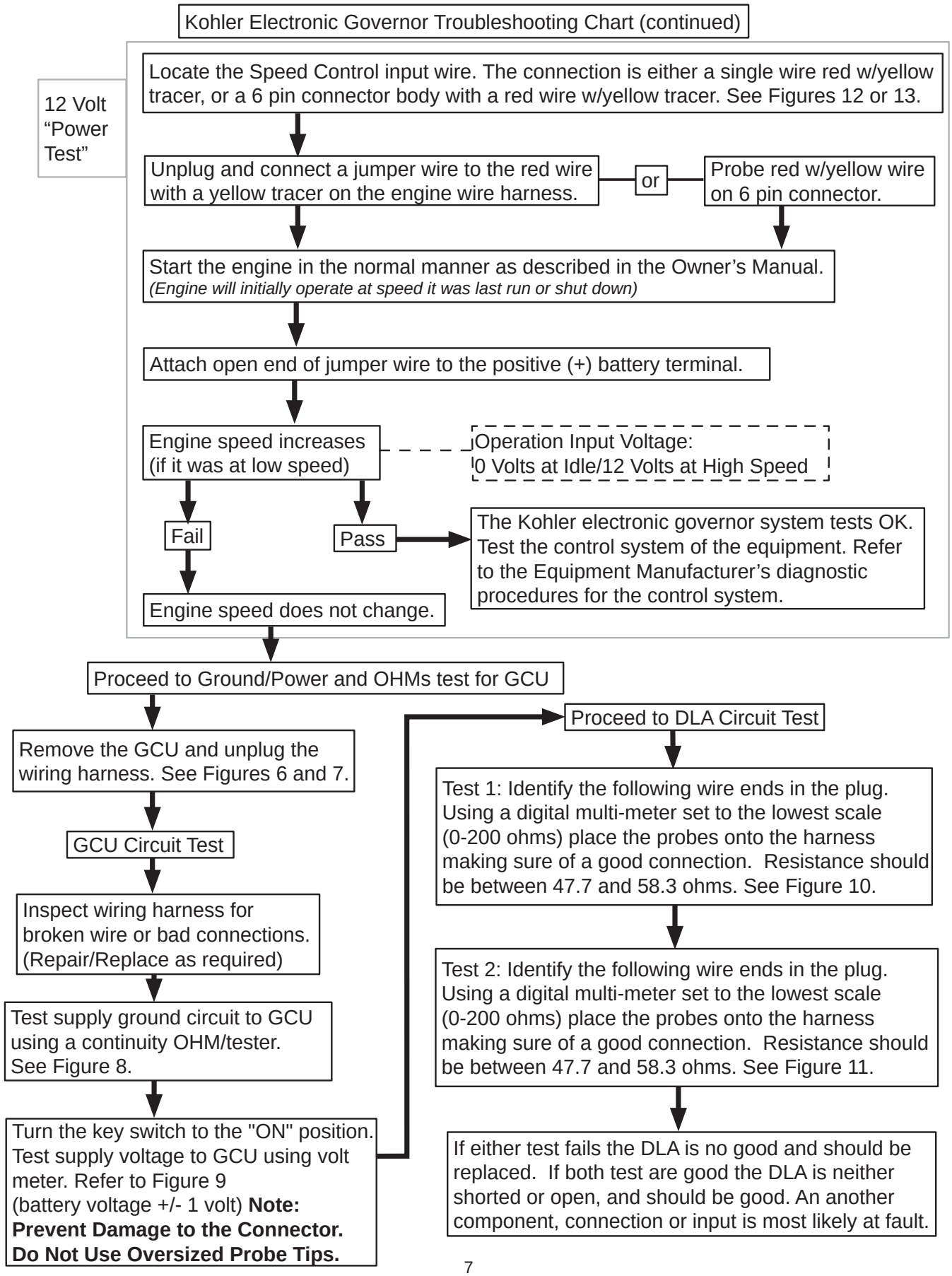
Arm and boot installation as follows, Refer to Figure 1, 4, or 5.
1. Remove the DLA from control assembly.
2. Pull clevis shaft completely out of DLA.
3. Reinstall the boot on the DLA if required.
4. Do Not push or force the clevis shaft into body, it must first be threaded and correctly aligned. Improper installation can permanently damage the DLA.
5. Lightly insert clevis shaft into body of DLA.
6. Thread 3 full turns or until you feel the internal key touch. Flat surface clevis should be in alignment with DLA mounting holes.
7. Firmly push DLA to bottom.
8. Connect clip.
9. Connect wire.

Start/test run unit for engine speed control operation.

Fail

Pass → Test the control system of the equipment. Refer to the Equipment Manufacturer's diagnostic procedures for the control system.

Go to 12 Volt "Power Test" on next page.


Kohler Electronic Governor Troubleshooting Chart (continued)
12 Volt "Power Test"
Locate the Speed Control input wire. The connection is either a single wire red w/yellow tracer, or a 6 pin connector body with a red wire w/yellow tracer. See Figures 12 or 13.
Unplug and connect a jumper wire to the red wire with a yellow tracer on the engine wire harness.
or
Probe red w/yellow wire on 6 pin connector.
Start the engine in the normal manner as described in the Owner's Manual.
(Engine will initially operate at speed it was last run or shut down)
Attach open end of jumper wire to the positive (+) battery terminal.
Engine speed increases (if it was at low speed)
Operation Input Voltage:
0 Volts at Idle/12 Volts at High Speed
Fail
Pass
The Kohler electronic governor system tests OK. Test the control system of the equipment. Refer to the Equipment Manufacturer's diagnostic procedures for the control system.
Engine speed does not change.
Proceed to Ground/Power and OHMs test for GCU
Remove the GCU and unplug the wiring harness. See Figures 6 and 7.
GCU Circuit Test
Inspect wiring harness for broken wire or bad connections. (Repair/Replace as required)
Test supply ground circuit to GCU using a continuity OHM/tester. See Figure 8.
Turn the key switch to the "ON" position. Test supply voltage to GCU using volt meter. Refer to Figure 9 (battery voltage +/- 1 volt) Note: Prevent Damage to the Connector. Do Not Use Oversized Probe Tips.
Proceed to DLA Circuit Test
Test 1: Identify the following wire ends in the plug. Using a digital multi-meter set to the lowest scale (0-200 ohms) place the probes onto the harness making sure of a good connection. Resistance should be between 47.7 and 58.3 ohms. See Figure 10.
Test 2: Identify the following wire ends in the plug. Using a digital multi-meter set to the lowest scale (0-200 ohms) place the probes onto the harness making sure of a good connection. Resistance should be between 47.7 and 58.3 ohms. See Figure 11.
If either test fails the DLA is no good and should be replaced. If both test are good the DLA is neither shorted or open, and should be good. An another component, connection or input is most likely at fault.
7

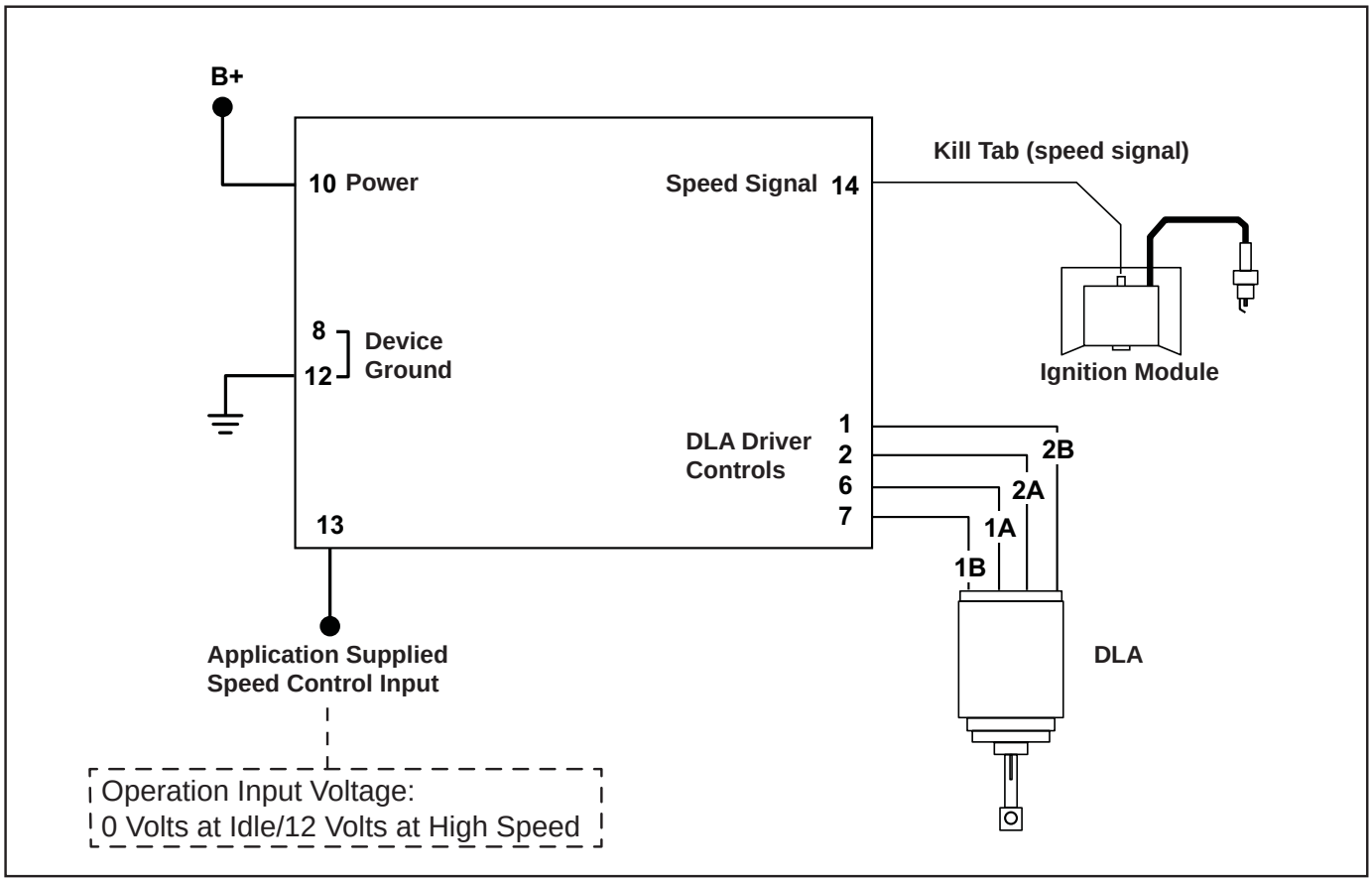


Figure 17. Basic Electrical Diagram of System.

KOHLER ENGINES

TechTip
2008-01

Electronic Governor
Overview, Diagnosing, and Troubleshooting
(Units with Governor Control Units 24 584 40-S or 24 584 56-S)

There have been some reports regarding the function, adjustment, and troubleshooting of the electronic governor system. Field reports indicate that a substantial number of field diagnoses are being done incorrectly. This document has been made to explain the system, aid in diagnosing and troubleshooting the system and its components.

Document Table Contents
General Description .....page 1
Component Description .....page 1
Mechanical Checks .....page 2
Harness/GCU
Troubleshooting Procedures .....pages 3-4
Blink Code Test .....pages 4-5
Troubleshooting
Flow Chart .....pages 6-7
Electrical Diagram .....page 8

General Description
The electronic governor regulates the engine speed at varying loads. It consists of linkage, a digital linear actuator (DLA), and a governor control unit (GCU). See Figures 1-3.

Component Description
The **Linkage** consists of a spring and other linkage pieces which connect the DLA to the throttle.

The **Governor Control Unit (GCU)** regulates the engine speed by a variable input voltage from the application (potentiometer or a single pole, single throw (SPST) switch). GCU safety features include an engine overspeed condition, the GCU will shut down the engine by grounding the ignition modules. Also, if power is lost to the GCU, the engine will shut down the engine by grounding the ignition.

The **Digital Linear Actuator (DLA)** converts electrical signals into precise stepped rotational movement through a stator-rotor combination. **Note: The DLA is not a solenoid. It is a delicate precision motor. Do not put force on the center shaft.** The DLA actuates the throttle linkage. When power is removed, the actuator shaft remains in position. Two DLA and linkage styles have been used to date. The new DLA and linkage style is backwards compatible. See Figure 2.

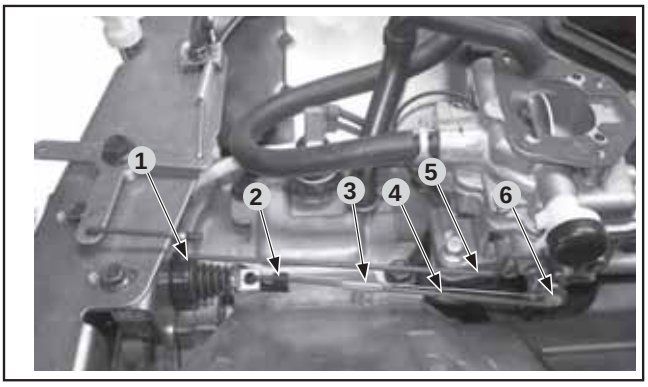


Figure 1. Governor Assembly Components.

1. Digital Linear Actuator
2. Linkage Retaining Clip - plastic
3. Linkage Spring
4. Throttle Linkage
5. Choke Linkage
6. Throttle Lever Adapter

Note: This is not a solenoid!
Do not exert force to the center shaft.

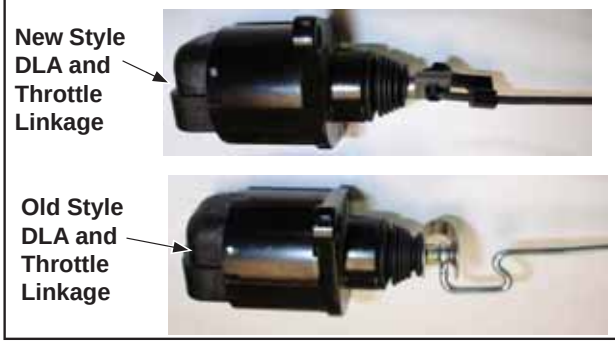


Figure 2. Digital Linear Actuator (New and Old Styles).

Litho In U.S.A. 2/08 Rev. 9/08
ENGINE DIVISION, KOHLER CO., KOHLER, WISCONSIN 53044

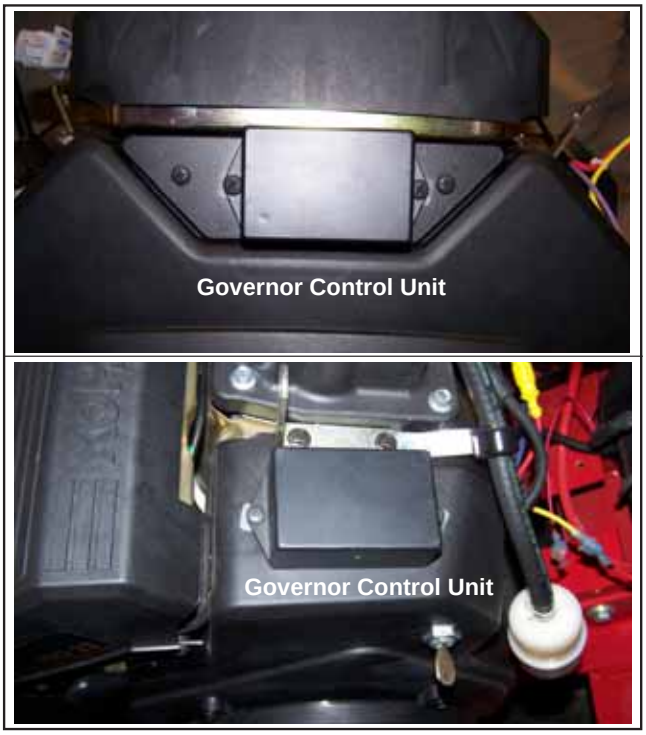


Figure 3. Governor Control Unit Locations.

Mechanical Checks

The DLA must be in the fully retracted position during assembly. The full range of throttle plate movement will not be achieved if the DLA is partially extended when assembled. Loosen the two DLA mounting plate screws located on the top of the actuator plate. With the throttle linkage centered in the U-Clip or secured with a retaining clip at the end of the DLA shaft, slide the DLA bracket assembly back until the throttle plate is fully open. Torque the mounting plate screws to **2.5 N·m (22 in. lb.)**.

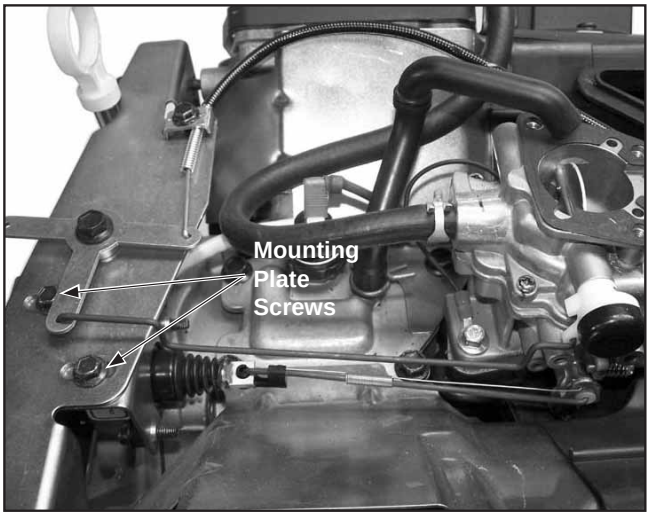


Figure 4. Throttle Plate Mounting Screws.

If the clevis shaft becomes overextended or disconnected from the actuator reinstall as follows:

1. Disconnect linkage and remove the Digital Linear Actuator (DLA) from the control assembly. See Figure 1.
2. Remove clevis shaft completely out of DLA. See Figure 5.
3. Reinstall the rubber boot onto the DLA if required.
4. Place the clevis shaft into the actuator. Rotate the clevis shaft clockwise 3 full turns, applying slight pressure, until you feel the clevis shaft keyway make contact with the key in the actuator. When the clevis shaft is installed properly the flat of the clevis will be aligned with the two mounting holes.

NOTE: Continuing to rotate the clevis shaft after it has made contact with the keyway will damage the keyway or the actuator.

5. Confirm that the key and keyway are in alignment, by hand, press the clevis shaft into the actuator. It will take a reasonable amount of pressure to do this. If the shaft will not move inward, do not force it. Remove the clevis shaft repeat the previous step.
6. Install DLA into the control assembly and connect linkage. See Figure 1.

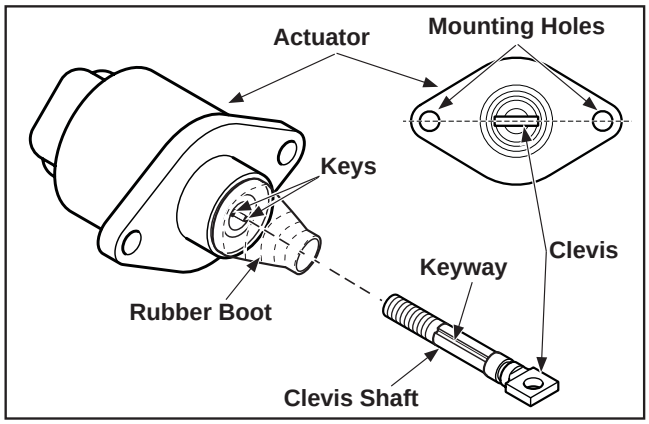


Figure 5. Exploded View of Clevis Shaft.

Harness/GCU Trouble Shooting and Diagnostic Procedures

1. Switch the key to the off position.
2. Remove the GCU and unplug the wiring harness. See Figures 6 and 7.

Figure 6. GCU Location Removal and Installation.

Figure 7. GCU, Wiring Harness, and Connector.

Ground and Power Tests

The following two tests check for power and ground supply to the GCU. If either test fails the harness, electrical connections, or electrical system needs repair.

NOTE: It is important to use the proper sized probes to preform the following test. Probes that are the incorrect size can damage the connector or harness plug.

Test 1: Identify the following probe location in the connector. Using a continuity tester, check for a good ground. See Figure 8. If the ground is faulty, inspect the unit ground, battery ground, connectors, and wiring harness. Clean or fix connections or replace any faulty parts.

If test 1 checks ok locate the following wire ends in the plug, and check using test #2.

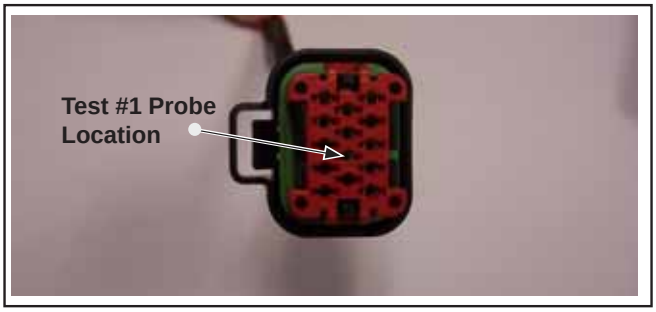


Figure 8. Test #1 Probe Location for Ground Test.

Test 2: Identify the following probe location in the connector. Using a 12 volt meter test for voltage. See Figure 9. The voltage should be within +/- 1 volt of battery voltage. If the voltage is within +/- 1 volt of battery voltage, harness is ok - Replace the GCU. If not within +/- 1 volt of battery voltage - Check connections and replace wiring harness if necessary.

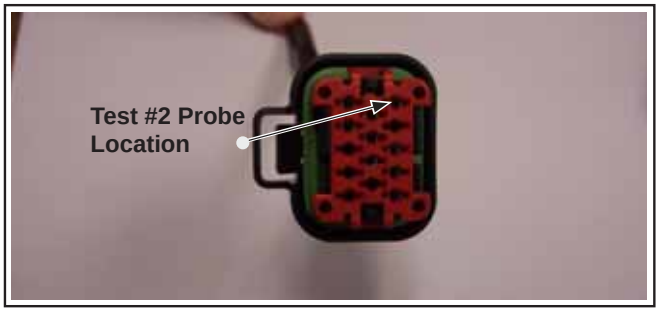


Figure 9. Test #2 Probe Location for Voltage Test.

OHMsTests

Remove the GCU and unplug the wiring harness. See Figure 6 and 7.

The following two tests are for measuring the resistance of the DLA circuit that send a signal to the GCU. If either test fails the DLA is no good and should be replaced. If both test are good the DLA is neither shorted or open, it is good. An another component, connection or input is most likely at fault.

Test 1: Identify the following wire ends in the plug. Using a digital multi-meter set to the lowest scale (0-200 ohms) place the probes onto the harness making sure of a good connection. Resistance should be between 47.7 and 58.3 ohms. See Figure 10.

If test 1 checks okay locate the following wire ends in the plug, and check using test #2.

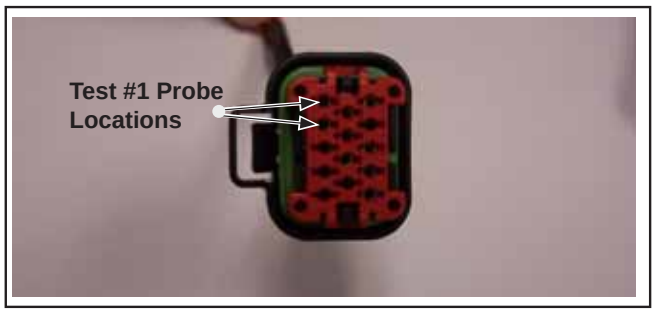


Figure 10. Test #1 Probe Locations for OHMs Test.

Test 2: Identify the following wire ends in the plug. Using a digital multi-meter set to the lowest scale (0-200 ohms) place the probes onto the harness making sure of a good connection. Resistance should be between 47.7 and 58.3 ohms. See Figure 11.

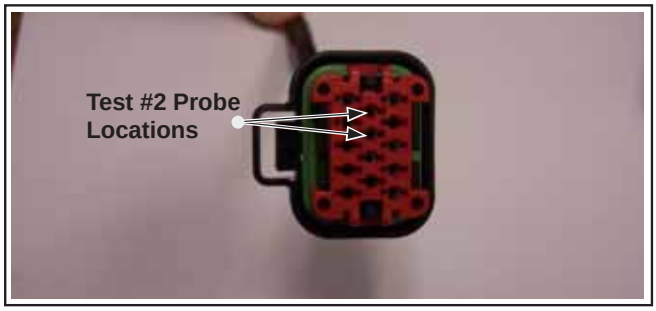


Figure 11. Test #2 Probe Locations for OHMs Test.

If either test 1 or 2 fail the resistance test, the fault could also be caused by a break/cut in the wiring harness. Inspect and test for a potential harness issue prior to replacing the DLA assembly.

Blink Code Tests for the GCU

Speed control issues can also be diagnosis utilizing the on-board - "Blink Code" diagnostic lights equipped in the new style GCU. See Figure 13. The new GCUs do not store blink code trouble codes, however speed control problems that are experienced with a running engine can be quickly diagnosed using the light codes and the blink code chart. See Figure 14.

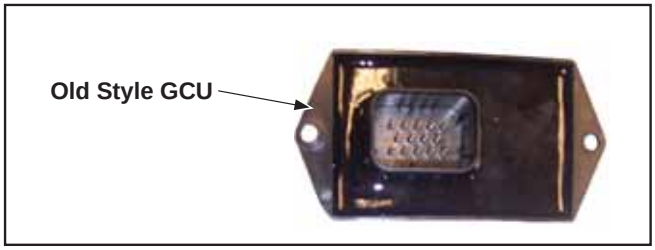


Figure 12. Old Style GCU.

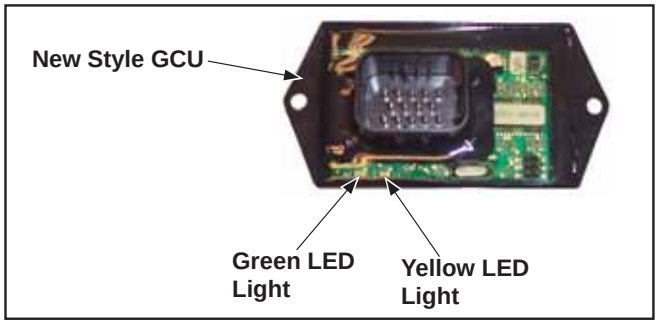


Figure 13. New Style GCU.

Kohler Engines - GCU (24 584 40-S or 24 584 56-S) Blink Codes					
				LED Diagnostics	
Failure Condition	**Possible Causes**	**Response**	**Response Time**	**Yellow LED**	**Green LED**
Overspeed (Over 4500 RPM for 0.5 seconds sustained)	External Noise on ignition input	Ground to kill, close carb throttle plate	0.2 seconds	Flashing	On
	Frozen carb throttle plate				
	DLA failure				
	Mechanical bindage				
Out of RPM range (Unable to maintain an average RPM of +/- 100 RPM of setpoint for 10 seconds)	Frozen carb throttle plate	Normal operation	10 seconds	N/C	Flashing
	DLA failure				
	Mechanical bindage				
	Bad fuel				
	Bad ignition system				
Missing ignition pulse detected	RFI interference	Normal operation	N/A	Pulse Off	N/C
	Poor lead connection				
	Bad ignition module				
Ignition module signal missing on startup	Ignition leads disconnected	DLA will remain at start point	N/A	Off	On
Watchdog Interrupt	RFI interference	Ground to kill, close carb throttle plate	N/A	Flashing	Flashing
	Overtemp				
	Software bug				
	Lightning				
Excessive Battery Voltage (> 18v for .5 seconds)		Ground to kill, close carb throttle plate	0.5 seconds	Flashing	Off
Good condition	Engine is operating normally	Normal operation	10 seconds of good engine run time	On	Solid on or solid off

Figure 14. GCU Blink Code Chart.

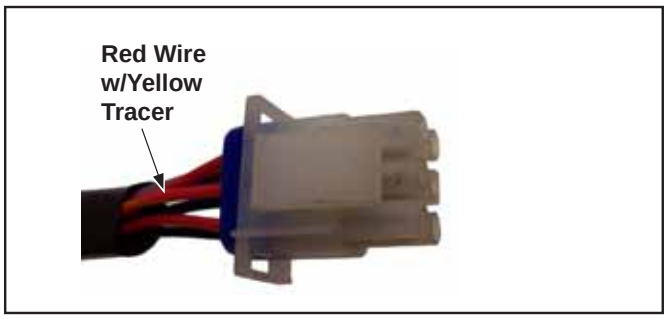


Figure 15. 6 Pin Connector.

Figure 16. Red Wire with Yellow Tracer.

Kohler Electronic Governor Troubleshooting Chart

Turn off key switch

Do Not Touch the Digital Linear Actuator (DLA)
NOTE: The DLA is not a solenoid. It is a precision electronic motor. Do not exert force to the center clevis shaft!

Visually inspect the DLA and Linkage. Figure 1 or 4

Fail if

Clevis shaft and boot are out of the DLA

Pass if

Confirm the following:
1. Clevis shaft and boot in place
2. Clip attached
3. DLA wire attached

Arm and boot installation as follows, Refer to Figure 1, 4, or 5.
1. Remove the DLA from control assembly.
2. Pull clevis shaft completely out of DLA.
3. Reinstall the boot on the DLA if required.
4. Do Not push or force the clevis shaft into body, it must first be threaded and correctly aligned. Improper installation can permanently damage the DLA.
5. Lightly insert clevis shaft into body of DLA.
6. Thread 3 full turns or until you feel the internal key touch. Flat surface clevis should be in alignment with DLA mounting holes.
7. Firmly push DLA to bottom.
8. Connect clip.
9. Connect wire.

Start/test run unit for engine speed control operation.

Fail

Go to 12 Volt "Power Test" on next page.

Pass

Test the control system of the equipment. Refer to the Equipment Manufacturer's diagnostic procedures for the control system.

Kohler Electronic Governor Troubleshooting Chart (Continued)

12 Volt "Power Test"

Locate the Speed Control input wire. The connection is either a single wire red w/yellow tracer, or a 6 pin connector body with a red wire w/yellow tracer. See Figures 16 or 17.

Unplug and connect a jumper wire to the red wire with a yellow tracer on the engine wire harness. — or — Probe red w/yellow wire on 6 pin connector.

Start the engine in the normal manner as described in the Owner's Manual.
(Engine will initially operate at speed it was last run or shut down)

Attach open end of jumper wire to the positive (+) battery terminal.

Engine speed increases (if it was at low speed)

Operation Input Voltage:
0 Volts at Idle / 12 Volts at High Speed

Fail

Pass → The Kohler electronic governor system tests OK. Test the control system of the equipment. Refer to the Equipment Manufacturer's diagnostic procedures for the control system.

Engine speed does not change.

Proceed to Ground/Power and OHMs test for GCU

Remove the GCU and unplug the wiring harness. See Figures 6 and 7.

GCU Circuit Test

Inspect wiring harness for broken wire or bad connections. (Repair/Replace as required)

Test supply ground circuit to GCU using a continuity OHM/tester. Refer to Figure 8

Test supply voltage to GCU using volt meter. Refer to Figure 9 (battery voltage +/- 1 volt)

Proceed to DLA Circuit Test

Test 1: Identify the following wire ends in the plug. Using a digital multi-meter set to the lowest scale (0-200 ohms) place the probes onto the harness making sure of a good connection. Resistance should be between 47.7 and 58.3 ohms. See Figure 10.

Test 2: Identify the following wire ends in the plug. Using a digital multi-meter set to the lowest scale (0-200 ohms) place the probes onto the harness making sure of a good connection. Resistance should be between 47.7 and 58.3 ohms. See Figure 11.

If either test fails the DLA is no good and should be replaced. If both test are good the DLA is neither shorted or open, and should be good. An another component, connection or input is most likely at fault.

7

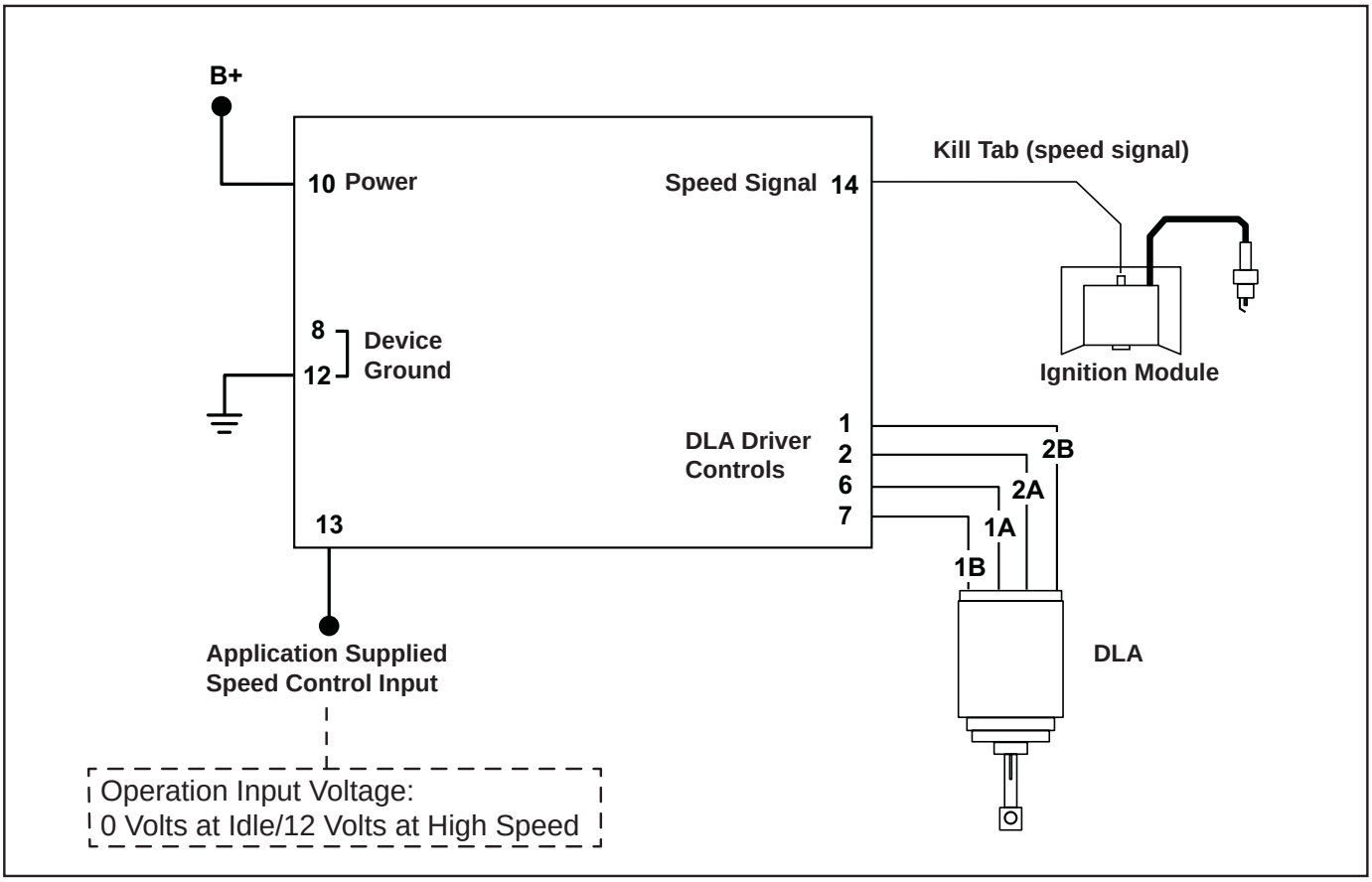


Figure 17. Basic Electrical Diagram of System.

KOHLER ENGINES

TechTip 2007-01

Kohler Engines Truck-Mounted Applications Grounding Instructions

There have been some reports regarding poor cranking performance on Kohler Engine-powered truck-mounted air compressors.

Field reports indicate that a substantial number of these cases are directly related to the battery connections that are poorly or improperly grounded. Some installations are found to utilize the vehicle battery, while others feature a battery dedicated to the compressor.

In most cases, the connection between the ground cable and the compressor engine are jeopardized due to a poor contact. The poor connections are caused by the ground cable being attached to a painted surface, or a surface that is less than adequate to carry the amount of current required, due to corrosion etc.

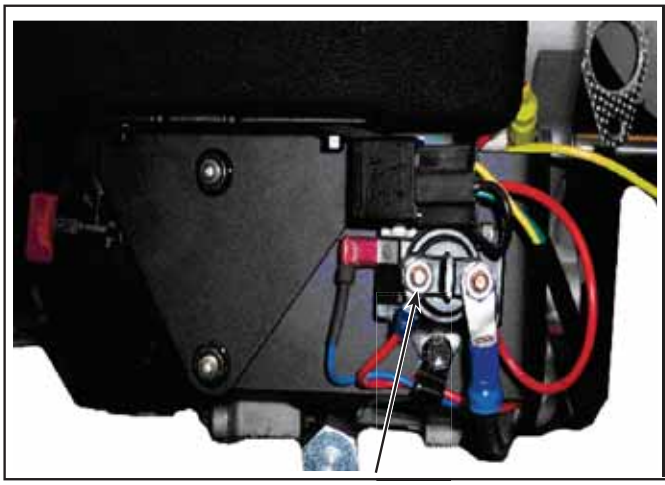
It is recommended that the compressor use a dedicated battery, mounted close to the engine, to keep the battery cable lengths short, allowing strong, uninterrupted current flow.

The following items are suggested. **NOTE:** Installations may vary due to different requirements.

Battery Requirements: A 12 volt battery with a minimum current rating of 240 cold cranking amps (cca) should be sufficient for cranking most single cylinder engine models.

Battery Cables: Use #4 or #6 gauge wire, from the battery positive terminal to the starter solenoid, and from the negative terminal to ground. Make sure that the remainder of the circuit from the negative terminal to the engine block is electrically equivalent. Ideally, the negative ground cable will be connected directly from the battery negative to the engine block. Refer to the chart below for SAE size and length recommendations. Always use the shortest length of wire possible without stressing the wire.

SAE Cable Size	Max. Length
6 Gauge	60.0 in. (152.4 cm)
4 Gauge	86.0 in. (218.4 cm)
2 Gauge	144.0 in. (365.7 cm)



Positive Battery Cable attachment (Solenoid post).

Optional ground cable attachment points (application dependant).

Litho In U.S.A. 7/07 ENGINE DIVISION, KOHLER CO., KOHLER, WISCONSIN 53044

Section 9
Technician's Service Test

This section contains two tests. The **Gasoline** test is 40 multiple-choice questions; the **Diesel** test is 10 multiple-choice questions. All questions have at least four possible answers, letters a, b, c, and d. Select the **ONE** best answer and mark your answer sheet by placing a dark **"X"** over the letter that identifies your selection.

Example:

25. The Kohler Engine plant is located in:

a. Chicago, IL.
b. Kohler, WI.
c. Phoenix, AZ.
d. none of the above.

In this example the best answer is b, so you would place an "X" over the letter on your answer sheet like shown here:

a **X** c d

Use a soft pencil to mark your answers. If you accidentally mark the wrong answer, erase it completely and mark the correct answer. ***Do not mark more than one answer for any one question.*** If two answers are marked, the question will be marked wrong. Any questions regarding the scoring of this test should be addressed with your Central Distributor.

Fill out the information at the top of the answer sheet and begin the test. When you are finished with the test, remove the answer sheet and return it to your Central Distributor.

A score of 75% or better will satisfy your requirement of attending the annual technicians' service program.

If you are a dealer for ***gasoline only***, you will not need to take the diesel test.

If you are a dealer for ***diesel only***, you will not need to take the gasoline test.

If you are ***gasoline and diesel***, you will need to take both tests.

Please remember that the answers to all of these questions can be found within the book. It is to your benefit to know the content before attempting to take these tests. Good Luck!

Gasoline Test Questions

1. **When should an EWR be started?**
   a. When the Dealer is too busy to process a warranty claim.
   b. When the Representative feels the necessity to do a goodwill claim on behalf of his/her customer.
   c. When a Dealer or Representative cannot assess the cause of the failure in materials or workmanship.
   d. When the consumer is too irate to communicate.

2. **Loose or cracked flywheel ring gears on Courage Series engines:**
   a. require a complete flywheel replacement as the ring gear is not serviceable.
   b. are serviceable with a bi-metallic ring gear.
   c. require a new steel ring gear to be pressed on the flywheel.
   d. require a replacement short block.

3. **The addition of the 190° and 205° thermostats for Aegis engines were because:**
   a. of hot starting issues.
   b. engines with light loads run cooler and may cause fuel dilution in the oil.
   c. heavy loads require a hotter thermostat.
   d. they are needed for starting in extreme cold temperatures.

4. **To reduce head gasket failures, a new flywheel has been developed for CH/CV730 engines to change ignition timing from 22° to 16° BTDC. If a head gasket repair is necessary,**
   a. it does not matter which way you install the 6° offset key as long as you install it with the 22° flywheel.
   b. the 6 degree offset key can be used to change timing on all models.
   c. a replacement flywheel is required.
   d. use a 6° offset key to retard the timing of a 22° flywheel.

5. **The new Smart-Choke$_{TM}$ feature of XT-6 and XT-7 means the user simply:**
   a. pumps the primer till the light turns on.
   b. touches the primer button once.
   c. pulls the recoil to start.
   d. pushes the choke button before starting.

6. **The electronic governor consists of:**
   a. a solenoid.
   b. a digital linear actuator (DLA).
   c. both B and D.
   d. a governor control unit (GCU) and linkage.

7. **The web-based warranty system will provide users the capacity to:**
   a. view their own dealership claim history.
   b. submit their own warranty claims.
   c. track progress of a warranty claim.
   d. All the above.

8. **The new commercial EFI engine features:**
   a. a cooled 5 wire oxygen sensor.
   b. a Sequential Injection system with a mass air sensor.
   c. a Closed Loop Injection system with a nitrous power boost on the governor.
   d. an engine mounted fuel pump, fuel pressure regulator, and electronic control unit.

9. **New Command PRO 6-14 hp features include:**
   a. straight cut gears and Flex Fuel capability.
   b. heavy-duty air filter and dual ball bearings standard.
   c. both B and D.
   d. larger fuel tank and Oil Sentry$_{TM}$ protection.

10. **When replacing a crankshaft because of broken gear you should:**
    a. only replace the crank gear.
    b. also replace the camshaft.
    c. sand blast the gear teeth on the camshaft to remove old wear patterns.
    d. lap gears together using lapping compound.

11. What is covered in the Electronic Governor TechTips?
a. Blink code information
b. Mechanical checks
c. Troubleshooting procedures
d. All of the above

12. Kohler PLUS has added many helpful features this year, they are:
a. Crankshaft illustrations and dimensions, carburetor repair kits when you enter a carburetor part number.
b. New service and parts bulletins posted for one month on ""News Flash"", Fast Moving Parts
c. Idle & High Speed RPM for each spec, search by description or part number.
d. All of the above.

13. What is the internet address of Kohler's new web-based Warranty Processing System?
a. http://enginewarranty.kohlerplus.com
b. www.enginewarranty.kohlernet.com
c. www.google.com
d. http://enginewarranty.kohlernet.net

14. How many Factory Training Schools are available in 2009?
a. 8
b. 4
c. 12
d. 6

15. The CV twin carburetor solenoid kit 24 757 22-S should include a plug installed in the end. Some kits were sent with a 120 jet instead. You must transfer the original jet, why?
a. The plug is no longer available.
b. The included jet is only used with E85 fuel.
c. The included jet is too small and performance will be affected.
d. The included jet is too large but can be repaired with solder and a 1/16" drill.

16. Information regarding whether an engine is EPA or CARB compliant or not can be found:
a. on the information tag located on the engine.
b. on the information tag located in the left door jam of the tractor.
c. stamped into the cylinder block near the starter.
d. on the information tag located on the oil filter.

17. When entering a part number in the new Kohler web-based warranty system you:
a. must use dashes in the part number.
b. must always use spaces in the part number.
c. do not need to enter a part number. The warranty system knows what parts you used.
d. must never use spaces in the part number.

18. The process used to weld the tank halves together on the XT-7 engine, has left hair-like fiber debris in the tank. Technical flash KEK-032008 suggests the following repair.
a. Blow compressed air in from the outlet side to force the debris out of the inlet side.
b. Use a .078 in. (2.2 mm) stiff wire probe and push it into the tank fuel outlet.
c. Use a .078 in. (2.2 mm) drill bit to clean the tank outlet and make sure you go in at least 2 in. (50.8 mm)
d. Blow compressed air into the tank from the inlet side to force it out the outlet side.

19. What engine horsepower range is the new commercial EFI system currently designed for?
a. 27 to 40 hp
b. 3.5 to 30 hp
c. 20 to 42 hp
d. 19 to 41 hp

20. The Courage Twin camshafts were changed to:
a. better fit the crankshaft gear.
b. reduce noise, weight and cost.
c. allow easier starts during winter operation.
d. prevent tooth failure of the gear.

21. The first step in any starter testing procedure is to check battery voltage. What is the voltage of a fully charged battery?
a. 13.8 to 14.7 VDC
b. 12 volts
c. 12.4 VDC or higher
d. 15 Amps

22. Is there a conversion kit for the analog SAM to the DSAI?
a. No, because flywheel timing and circuitry are different for each system.
b. Yes, because they have the same ignition module.
c. Yes, the benefit will be fixed timing.
d. Yes, the kit includes a flywheel.

23. When submitting a warranty claim for processing in the new Kohler web based warranty system:
a. always use the **Action** button to send your claim.
b. only use the **Save** button.
c. do nothing, the claim will be sent when the computer is shut down.
d. claims are processed based on the parts you purchased.

24. When converting a CV730 or 750 from RTV to a pan gasket how many shims are recommended for use on the camshaft to prevent end play?
a. No shims are recommended because the gasket is not any thicker than the RTV sealant.
b. One shim is required to compensate for end play.
c. Two shims are required to compensate for end play.
d. You must first use plasti-guage to measure how wide the gap is and then determine the number of shims you will need.

25. The 3rd generation balance system for Courage Singles will:
a. reduce labor costs during major engine repairs.
b. retro fit with 2nd generation piston and rods.
c. provide better alignment for the connecting rod.
d. extend bearing life and hold vibration to a minimum.

26. Kohler has introduced new commercial and consumer lines of engines. What features are shared by both?
a. Indexable anti-icing air cleaner cover, Oil Sentry™ low oil sensor
b. Cast iron cylinder liner, dual ball bearings, water trap carburetor and large metal fuel tank
c. Pressurized pump lubrication system, Smart-Choke™ starting system
d. Smart-Choke™ and Electric Starting System

27. SAE 30 oil is now an approved oil for Command engines with hydraulic lifters. At what temperatures can SAE 30 be used?
a. Above 50°F (10°C)
b. Above 32°F (0°C)
c. Between 10°F (12°C) and 32°F (0°C)
d. Below 10°F (12°C)

28. When making a Kohler PLUS inquiry at engineparts@kohler.com, always include your:
a. model, spec, and serial number.
b. company name and address, Central Distributor, and telephone number.
c. company name and address, as well as your 9- or 11- digit warranty ID number.
d. name, rank, and serial number.

29. A Courage XT with a serial number between 3728100028 and 3730500008 has symptoms of hard starting or poor acceleration. This is most likely caused by:
a. the wrong fuel filter installed at the factory.
b. fuel tank debris. See Technical Flash KEK-032008.
c. the fuel outlet on the tank was not designed large enough.
d. the fuel cap that was not vented during manufacturing.

30. The diode used in the upgraded DSAI wire harness protects the DSAI from voltage spikes up to how many watts?
a. 5,000 watts
b. 6,000 watts
d. 4,000 watts
c. 3,000 watts

31. What fuel filter part number/numbers can be used on engines with fuel pumps?
a. 25 050 22-S and 25 050 21-S
b. 25 050 22-S and 52 050 02-S
c. 25 050 22-S and 24 050 03-S
d. 25 050 22-S and 12 050 01-S

32. The EWR program is intended to determine what?
a. If OEM equipment will work with defective parts.
b. The degree as to which the consumer feels confident with the product.
c. The frequency of interaction between the factory and the dealers.
d. The root cause of engine failure or concerns that occur in the field.

33. To prevent the carburetor on the new Command Pro horizontal engine from freezing up during seasonal cold weather changes, Kohler has built in what feature?
a. A heater box designed to use warm air from the muffler to keep the carburetor fro freezing up
b. A removable tab in the air cleaner that allows warm air into the carburetor
c. An indexable air cleaner cover that can be rotated to capture warm air from the muffler during cold weather operation
d. A lever that can be moved to control the flow of warm air during seasonal cold weather changes

34. The connecting rod was changed on Courage Singles to:
b. allow proper fit to the new style piston.
a. prevent wear in the rod bearing.
c. increase compression for added performance.
d. a PM material with molybdenum for added strength.

35. What part number would you need for an anti-icing kit on a CH18 in 20°F (-7°C) weather with a PTO muffer?
a. 24 755 64-S
b. 24 755 69-S
c. 24 755 165-S
d. 54 755 06-S

36. What is the warranty for a commercial user on the new Command Pro horizontal engine line?
a. 1 year
b. 6 months
c. 2 years
d. 90 days

37. Where can you find Kohler carburetor repair kits?
a. No where, they don't exist.
b. In Kohler plus by carb part number.
c. Only in microfiche, nowhere else.
d. Only in the carb reference manual, nowhere else.

38. In the SV Single Owners Manual you will find a new emission statement that recommends:
a. the combustion chamber be cleaned between 200 and 400 hours.
b. E20 gasoline.
c. SAE 30 oil below 50°F (10°C).
d. cleaning the air filter weekly.

39. After the Dealer and Representative have analyzed the engine or component and cannot determine the cause of failure what is the next step?
a. Send the engine to Kohler Engines Service Dept.
b. File a warranty claim and wait for the results.
c. Contact Kohler Factory Field Service.
d. Repair the unit and charge the customer.

40. You installed a new oil pump in a CV750 but now the crank hits the new gear. What happened?
a. You installed the pump out of time.
b. You installed an old style tall geared pump.
c. The main thrust bearing has moved and should be replaced.
d. Nothing is wrong. The engine just needs to run through a break in period.

Diesel Test Questions

1. **The new style key for the LDW and or KDW series engines key switch is cut on how many sides?**
   a. One
   b. Two
   c. None
   d. Three

2. **If replacing the old style coolant temperature switch and thermistor switches with the new style single switch, what is the part number of the pigtail wiring adaptor you will need?**
   a. ED2175-107-S
   b. ED5840-224-S
   c. ED2185-822-S
   d. ED2186-095-S

3. **In the new style fuel filter head for the liquid-cooled series, where is the fuel from the fuel rail return outlet being routed?**
   a. The fuel filter head
   b. The fuel tank
   c. The fuel lift pump
   d. None of the above

4. **An auxiliary fuel pump of how many PSI is recommended to be placed in front of the QSD?**
   a. 6-8 psi
   b. 12-15 psi
   c. A fuel pump is not recommended in front of the QSD
   d. Any psi pump is ok

5. **An hour meter on the LDW (KDW) control panel is?**
   a. Standard
   b. Not available
   c. Optional
   d. Not required

6. **What is the hold down nut torque on the 15LD 400 (KD400) rocker arm?**
   a. 10 N·m
   b. 22 N·m
   c. 20 N·m
   d. It should not be torqued

7. **To bypass the fuel solenoid on the 15LD 350D (KD350) what position does the lever on the fuel solenoid need to be in?**
   a. Up
   b. Down
   c. There is no lever
   d. It doesn't matter

8. **The valve clearance setting on the 25LD 425-2 (KD425-2) is what?**
   a. 0.15 mm
   b. 0.015 mm
   c. 1.5 mm

9. **The new style cylinder head bolt on the LDW 1404 (KDW1404) is what size?**
   a. 13 mm hex
   b. E14 Torx
   c. T30 Torx
   d. 17 mm hex

10. **On part number ED2186-095-S what color is the wire for the T2 terminal?**
    a. Blue
    b. Yellow with a green stripe
    c. Red
    d. Black

Answer Sheet for the 2008-2009 Kohler Technician's Service Program Test

Name _____

Company Name _____ Warranty I.D. No. _____

Gasoline Test Answer Sheet

1.	a	b	c	d	21.	a	b	c	d
2.	a	b	c	d	22.	a	b	c	d
3.	a	b	c	d	23.	a	b	c	d
4.	a	b	c	d	24.	a	b	c	d
5.	a	b	c	d	25.	a	b	c	d
6.	a	b	c	d	26.	a	b	c	d
7.	a	b	c	d	27.	a	b	c	d
8.	a	b	c	d	28.	a	b	c	d
9.	a	b	c	d	29.	a	b	c	d
10.	a	b	c	d	30.	a	b	c	d
11.	a	b	c	d	31.	a	b	c	d
12.	a	b	c	d	32.	a	b	c	d
13.	a	b	c	d	33.	a	b	c	d
14.	a	b	c	d	34.	a	b	c	d
15.	a	b	c	d	35.	a	b	c	d
16.	a	b	c	d	36.	a	b	c	d
17.	a	b	c	d	37.	a	b	c	d
18.	a	b	c	d	38.	a	b	c	d
19.	a	b	c	d	39.	a	b	c	d
20.	a	b	c	d	40.	a	b	c	d

Diesel Test Answer Sheet

1.	a	b	c	d	6.	a	b	c	d
2.	a	b	c	d	7.	a	b	c	d
3.	a	b	c	d	8.	a	b	c	d
4.	a	b	c	d	9.	a	b	c	d
5.	a	b	c	d	10.	a	b	c	d

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